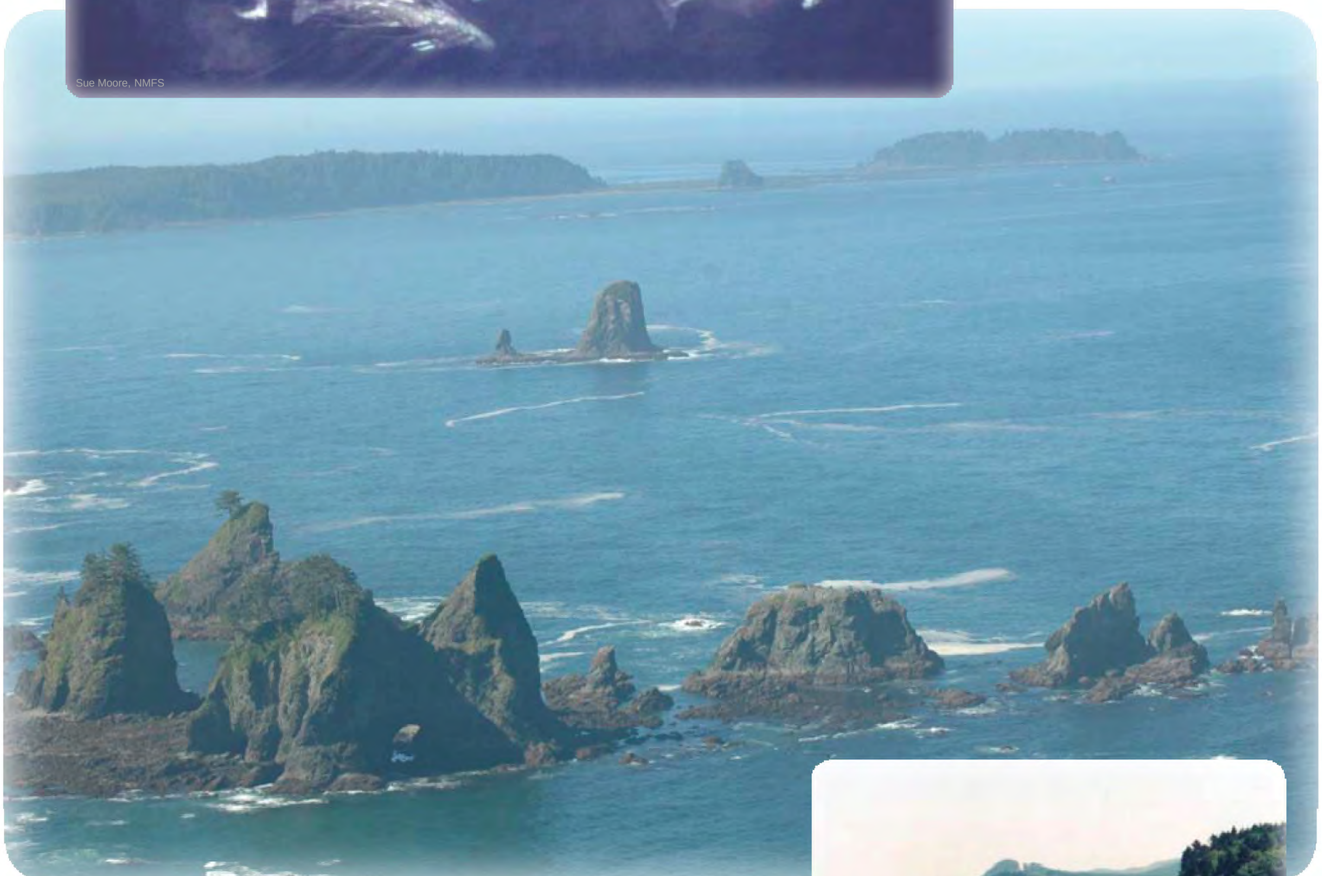
Draft Environmental Impact Statement
for Proposed Authorization of the Makah Whale Hunt



United States Department of Commerce
National Oceanic and Atmospheric Administration

National Marine Fisheries Service, Northwest Region

May 2008

Executive Summary

EXECUTIVE SUMMARY

The action considered in this draft environmental impact statement (DEIS) concerns the Makah Indian Tribe's February 2005 request to resume limited hunting of eastern North Pacific (ENP) gray whales (*Eschrichtius robustus*) in the coastal portion of the Tribe's usual and accustomed fishing grounds (U&A), off the coast of Washington State, for ceremonial and subsistence purposes. The Tribe's proposed action stems from the 1855 Treaty of Neah Bay, which expressly secures the Makah Tribe's right to hunt whales. To exercise that right, the Makah Tribe is seeking authorization from the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) under the Marine Mammal Protection Act and the Whaling Convention Act.

This DEIS, prepared pursuant to the National Environmental Policy Act (42 USC 4321 et seq.), considers various alternatives to the Tribe's proposed action. To develop the full range of action alternatives, NMFS considered the principal components associated with a hunt, including: the time when whale hunting would occur; the area where whale hunting would occur; the annual and five-year limits on the number of whales harvested, struck, and struck and lost; cessation of whale hunting if a predetermined number of identified whales (i.e., included in a photographic catalog of whales from the Pacific Coast Feeding Aggregation area) were harvested; and the method of hunting. The resultant alternatives are:

- Alternative 1, the No-action Alternative, wherein NMFS would not authorize a Makah gray whale hunt.
- Alternative 2, the Proposed Action Alternative, would allow harvest of four gray whales per year on average (with a maximum of five in any one year) and up to 20 whales in a 5-year period. Hunting would be allowed in the Tribe's U&A outside the Strait of Juan de Fuca from December 1 to May 31. Hunting would not be allowed within 200 yards of

Tatoosh Island and White Rock. The number of whales that could be struck would be limited to no more than seven in any calendar year and no more than 35 over the 5-year period, while the number of whales struck and lost would be limited to three annually and 15 over the 5-year period. The maximum number of whales struck in any year would be seven, and the maximum number struck and lost would be three.

- Alternative 3 includes the same area for the hunt as Alternative 2, but would eliminate timing and other restrictions on killing and landing identified whales.
- Alternative 4 would have the same conditions as Alternative 2, except that it would also prohibit vessels associated with any Makah hunt (including Makah vessels and associated protest, media, and law enforcement vessels) from entering the 200-yard exclusionary zone that the United States Fish and Wildlife Service has established around all rocks or islands comprising the Washington Islands National Wildlife Refuges.
- Alternative 5 would include the same hunting area as Alternative 2, but would differ by eliminating timing restrictions and the restrictions on landing identified whales, as well as imposing additional restrictions on the total number of whales harvested, struck, and struck and lost.
- Alternative 6 is the same as Alternative 3, except that the Tribe could hunt throughout its entire U&A, including the Strait of Juan de Fuca. Similar to Alternatives 3 to 5, there would be no timing restrictions or harvest limitations specifically for identified whales.

NMFS developed these alternatives with input from NMFS staff, the Makah Tribe, the cooperating agency (i.e., Bureau of Indian Affairs), and oral and written comments from the public. This DEIS addresses a number of resources identified for review during both internal and public scoping, including: water quality, marine habitat and species, ENP gray whales, other wildlife species, economics, environmental justice, social environment, cultural resources, ceremonial and subsistence resources, noise, aesthetics, transportation, public services, public safety, and human health.

This DEIS provides an important opportunity for the public to formally comment on the Tribe's proposal and the various alternatives. NMFS will address public comments in the final version of the EIS. These comments, in conjunction with considerations described in this DEIS, will provide key information to assist NMFS with its final decision on the Tribe's request.

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REFERENCES

List of Acronyms and Abbreviations

ABL	allowable bycatch level
BIA	Bureau of Indian Affairs
C	Celsius
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeters
CZMA	Coastal Zone Management Act
dB	decibal
DDT	dichloro-diphenyl-trichloroethane
DNA	deoxyribonucleic acid
dw	dry weight
EA	Environmental Assessment
Ecology	Washington Department of Ecology
EEZ	exclusive economic zone
EIS	Environmental Impact Statement
ENP	eastern North Pacific
EPA	U.S. Environmental protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
F	Fahrenheit
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
FR	Federal Register
FWS	U.S. Fish and Wildlife Service
g	gram
Hz	hertz
ICRW	International Convention for the Regulation of Whaling
IU	international units
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission

K	carrying capacity
kg	kilogram
Makah or Tribe	Makah Indian Tribe
MEZ	moving exclusionary zone
mg	milligram
ml	milliliter
MMC	Marine Mammal Commission
MMPA	Marine Mammal Protection Act
MNPL	maximum net productivity level
MSA	Magnuson-Stevens Act
MSY	maximum sustainable yield
mtDNA	mitochondrial DNA
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
OCNMS	Olympic Coast National Marine Sanctuary
ORSVI survey area	Oregon-Southern Vancouver Island survey area
OSP	optimum sustainable population
PBR	potential biological removal
PCBs	polychlorinated biphenyls
PCDD	polychlorinated dibenzodioxin
PCDF	polychlorinated dibenzofuran
PCFA survey area	Pacific Coast Feeding Aggregation survey area
PFMC	Pacific Fishery Management Council
pH	potential of Hydrogen (acidity or alkalinity)
PL	public law
RCW	revised code of Washington
RNA	regulated navigation area
ROD	Record of Decision
Sanctuary	Olympic Coast National Marine Sanctuary
TCDD	tetrachlorodibenzodioxin

TCDF	tetrachlorodibenzofuran
Treaty	1855 Treaty of Neah Bay
U&A	Usual and Accustomed fishing grounds
U.S.C.	United States Code
ug	microgram
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
WCA	Whaling Convention Act
WDFW	Washington Department of Fish and Wildlife
ww	wet weight

Glossary

.50 and .577 caliber rifle = High-powered rifles designed to shoot a bullet of diameter 0.5 inches or 0.577 inches, respectively.

Aboriginal subsistence whaling = As defined in regulations implementing the Whaling Convention Act, aboriginal subsistence whaling refers to whaling authorized by paragraph 13 of the Schedule annexed to and constituting a part of the Convention (i.e., International Convention for the Regulation of Whaling). The Schedule does not otherwise define aboriginal subsistence whaling, but the International Whaling Commission adopted the following definition of subsistence use by consensus at its 2004 annual meeting: (1) The personal consumption of whale products for food, fuel, shelter, clothing, tools, or transportation by participants in the whale harvest; (2) The barter, trade, or sharing of whale products in their harvested form with relatives of the participants in the harvest, with others in the local community or with persons in locations other than the local community with whom local residents share familial, social, cultural, or economic ties. A generalized currency is involved in this barter and tra[d]e, but the predominant portion of the products from each whale are ordinarily directly consumed or utilized in their harvested form within the local community; (3) The making and selling of handicraft articles from whale products, when the whale is harvested for the purposes defined in (1) and (2) above. General principles governing aboriginal subsistence whaling are contained in the Schedule.

Aboriginal subsistence whaling quota = Number of whales that may be taken by a Native American whaling organization for subsistence uses.

Adaptive management plan = A management approach wherein a plan is changed and improved in response to lessons learned during plan implementation.

Alaska Eskimos/Alaska Natives = A group of native people living in the Arctic coastal regions of Alaska.

Algal bloom = A rapid and often visible increase in the population of (usually) phytoplankton algae in an aquatic system.

Allowable Bycatch Level (ABL) = As defined in the Makah Tribe's waiver request, the number of whales from the Pacific Coast Feeding Aggregation that may be taken incidental to a hunt directed at the migratory portion of the Eastern North Pacific stock of gray whales. The ABL is calculated using the Marine Mammal Protection Act's potential biological removal approach but the minimum population estimate is calculated from the number of previously seen whales in the Oregon-Southern Vancouver Island survey area.

Ancestral villages = A settlement that has been inhabited for many generations.

Ancient canoe runs = Sub- and inter-tidal areas where it is possible to see old pathways perpendicular to the shoreline that were cleared of boulders and cobbles to allow canoes to reach shore without being damaged.

Baleen whale = A whale of the Suborder Mysteceti whose members have comb-like baleen plates (instead of teeth) which enable them to filter food from the water. As defined by the June 2007 Schedule to the International Convention for the Regulation of Whaling, baleen whale means any whale which has baleen or whale bone in the mouth (i.e. any whale other than a toothed whale).

Benthic = Living on the bottom of the ocean.

Benthos = The collection of organisms living on the bottom of the ocean.

Bequians = Inhabitants of Bequia, the second largest of the thirty-two islands and cays that make up the island state of St. Vincent & the Grenadines.

Bilateral agreement = An agreement between two countries detailing their mutual understanding, policies, and obligations on a particular matter.

Bunker fuel = A common and often low grade fuel used to power cargo ships.

Bureau of Indian Affairs = A United States agency within the Department of the Interior charged with the administration and management of land held in trust by the United States for American Indians, Indian tribes and Alaska Natives. In addition, the Bureau of Indian Affairs provides education services to approximately 48,000 Indians.

Calf (whale) = As defined by regulations implementing the Whaling Convention Act, a calf is any whale less than 1 year old or having milk in its stomach.

Cervical and cranial thoracic regions = Relating to the neck (cervical) or skull (cranial) in the chest (thoracic) region of a whale.

Cetacean = Refers to an animal belonging to the order Cetacea, which includes sea mammals such as whales and dolphins.

Chase boat = According to the Makah waiver application, a powered boat that assists in the whale hunt by staying in close proximity to the whaling crew in the canoe and towing a harvested whale to shore. In the Makah proposal each chase boat would be manned by a pilot, diver, rifleman, backup harpooner, and at least one other crew member, and would be equipped with a navigation system capable of fixing the vessel's position on the water.

Chukotka natives = Aboriginal people located in the far northeast of the Russian Federation.

Coastal Zone Management Act (CZMA) = A United States law that regulates development in coastal areas.

Code of Federal Regulations (CFR) = The United States government's codification of the general and permanent rules and regulations (sometimes called administrative law) published in the Federal Register by the executive departments and agencies of the United States Federal Government. The CFR is published by the Office of the Federal Register, an agency of the National Archives and Records Administration.

Contracting Government = A country/government party to the International Convention for the Regulation of Whaling.

Cooperative agreement = As defined by regulations implementing the Whaling Convention Act, a cooperative agreement is a written agreement between the National Oceanic and Atmospheric Administration and a Native American whaling organization for the cooperative management of aboriginal subsistence whaling operations.

Council on Environmental Quality (CEQ) = A division of the White House established as part of the National Environmental Policy Act of 1969. The CEQ issues an annual report to the President of the United States on the state of the environment; coordinates United States environmental efforts and works closely with agencies and other White House offices in the development of environmental and energy policies and initiatives; oversees federal agency implementation of the environmental impact assessment process; and acts as a referee when agencies disagree over the adequacy of such assessments.

Cultural Anthropology Panel = A group of experts in cultural anthropology convened by the International Whaling Commission in 1979 to discuss the Alaska Eskimo bowhead hunts.

Darting gun = A hand thrown device consisting of a barrel (to hold an explosive projectile) that is attached to a wooden shaft equipped with a toggle-point harpoon. The barrel contains a trigger rod that ignites a propellant or 'pusher' charge which fires the explosive projectile into the whale's body.

Decibels = A unit of measurement for sounds, in particular the loudness of sounds.

Delegates = Members of delegations, headed by commissioners, representing member nations that are party to the International Whaling Commission.

Deoxyribonucleic acid (DNA) = A large, double-stranded, helical molecule found in the nucleus of cells that carries the genetic code for an organism.

Dispatch = To kill a whale that has been struck.

Diver = According to the Makah waiver application, a member of the whaling crew whose duties include diving into the water from the chase boat to attempt to sew a whale's mouth shut to prevent the whale from sinking after it has been struck by the harpooner and shot by the rifleman.

Drift whale = A whale that dies naturally or as a result of some human activity other than a directed hunt (for example, entanglement in fishing gear).

Ecotourism = Tourism that focuses on the natural ecological attributes of an area (e.g., whale-watching) and their preservation.

Ecotype = A subgroup of a species that is differentiated from other subgroups by distinct adaptations to a particular habitat.

Eight-gauge shoulder gun = A shoulder-mounted firearm with a long, smooth-bore barrel capable of shooting a 0.835-inch projectile.

Endangered species = As defined in the Endangered Species Act, an endangered species means any species which is in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act (ESA) = A United States law that provides for the conservation of endangered and threatened species of fish, wildlife, and plants.

Endangered species list = The List of Endangered and Threatened Wildlife (50 CFR 17.11), and the List of Endangered and Threatened Plants (50 CFR 17.12) name all species of mammals, birds, reptiles, amphibians, fishes, insects, plants, and other creatures that have been determined by the National Marie Fisheries Service or the United States Fish and Wildlife Service to be in the greatest need of Federal protection. Once listed, a species receives the full range of protections available under the Endangered Species Act, including prohibitions on killing, harming or otherwise taking a species.

Environmental Assessment (EA) = In the context of National Environmental Policy Act, an EA is a concise public document that analyzes the environmental impacts of a proposed Federal action and provides sufficient evidence to determine the level of significance of the impacts. The EA includes a brief analysis of the environmental impacts of the proposed action and its alternatives, and results in one of two determinations: (1) an Environmental Impact Statement is required; or (2) a Finding of No Significant Impact.

Environmental Impact Statement (EIS) = A detailed written statement required by the National Environmental Policy Act and prepared by a federal agency. The EIS is used by decisionmakers to take environmental consequences into account. It describes a proposed action, the need for the action, alternatives considered, the affected environment, the environmental impacts of the proposed action, and other reasonable alternatives to the proposed action. An EIS is prepared in two stages: a draft and a final.

Environmental Protection Agency (EPA) = A United States agency responsible for protecting human health and the environment.

Eskimos = See Alaska Eskimos.

Evolutionarily significant unit (ESU) = A concept the National Marine Fisheries Service uses to identify distinct population segments of Pacific salmon under the Endangered Species Act. An ESU is a population or group of populations of Pacific salmon that (1) is substantially reproductively isolated from other populations and (2) contributes substantially to the evolutionary legacy of the biological species.

Exclusive economic zone (EEZ) = A coastal zone under national jurisdiction (up to 200-nautical miles wide) declared under the provisions of the 1982 United Nations Convention of the Law of the Sea, within which the United States has the rights over the use and exploration of marine resources. The United States EEZ in the northern portion of the Makah Usual and Accustomed fishing grounds is much narrower than 200 nautical miles due to the international boundary with Canada.

Federal Register = The United States government's daily publication of federal agency regulations and documents, including presidential proclamations, executive orders, and documents that must be published per acts of Congress.

Finding of No Significant Impact (FONSI) = A short National Environmental Policy Act document that presents the reasons why an action will not have a significant impact on the quality of the human environment and, therefore, will not require preparation of an Environmental Impact Statement. A Finding of No Significant Impact must be supported by the Environmental Assessment.

First Nation = A term referring to the aboriginal people located in what is now Canada.

Flense = To strip the blubber or skin from a dead whale.

Floats = Air-filled buoys attached by ropes to a struck or dead whale using a harpoon with a toggle point head. The floats keep the whale on the water surface so that it can be towed to shore for butchering.

Harassment = As defined in regulations implementing the Marine Mammal Protection Act, harassment means any act of pursuit, torment, or annoyance which: (1) has the potential to injure a marine mammal or marine mammal stock in the wild; or (2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. In the case of a military readiness activity or a scientific research activity conducted by or on behalf of the Federal Government, the term harassment means (1) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild; or (2) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered.

Harpooner = According to the Makah waiver application, a member of the whaling crew whose duties include throwing a long spear-like harpoon at a whale in order to embed a steel barb and its accompanying line and floats into the animal. A backup harpooner accompanies a separate crew on the tribal chase boat.

Harvest = To kill and land a whale.

Haulout = A site where seals, sea lions, and other marine mammals climb out of the water to rest on land.

Hertz = A measurement of vibration or frequency expressed in cycles per second. One hertz equals one cycle per second.

Humane = As defined in regulations implementing the Marine Mammal Protection Act, the term humane refers to that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved.

Identified whale = A whale photographed in the Pacific Coast Feeding Aggregation and Oregon-Southern Vancouver Island survey areas in a prior summer feeding period and identifiable in the National Marine Mammal Laboratory's photographic identification catalog.

Indian Civil Rights Act = A United States law that prohibits Indian tribal governments from enacting or enforcing laws that violate certain individual rights. It was adopted by the United States Congress to ensure that tribal governments respect basic rights of Indians and non-Indians.

International Convention for the Regulation of Whaling (ICRW) = An international treaty (also referred to as the "Convention") signed in 1946 designed to "provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry." A focus of the treaty was the establishment of the International Whaling Commission. There are presently 79 member nations to the ICRW, including the United States.

International Whaling Commission (IWC) = A body of commissioners charged with carrying out the provisions of the ICRW.

IWC aboriginal subsistence whaling = See Aboriginal subsistence whaling

IWC Commercial Whaling Moratorium = A moratorium on all commercial whaling approved by the International Whaling Commission in 1982 which effectively expanded the 1937 ban on commercial harvest of gray whales and right whales to all large whale species.

IWC Scientific Committee = A part of the International Whaling Commission (IWC), this group consists of approximately 200 of the world's leading whale biologists who provide advice on the status of whale stocks. The IWC Scientific Committee meets annually in the two weeks immediately preceding the main International Whaling Commission meeting. It may also call special meetings as needed to address particular subjects during the year.

Land/Landing = As defined by regulations implementing the Whaling Convention Act, landing means bringing a whale or any parts thereof onto the ice or land in the course of whaling operations.

Landfill = A place where solid waste (garbage) is disposed between layers of dirt.

Level A harassment = As defined in regulations implementing the Marine Mammal Protection Act, Level A harassment means any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild. In the case of a military readiness activity or a scientific research activity conducted by or on behalf of the Federal Government, the term Level A harassment means any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild.

Level B harassment = As defined in regulations implementing the Marine Mammal Protection Act, Level B harassment means any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. In the case of a military readiness activity or a scientific research activity conducted by or on behalf of the Federal Government, the term Level B harassment means any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered.

Local aboriginal consumption = A phrase defined by the 1981 *Ad Hoc* Technical Working Group (but not formally adopted by the International Whaling Commission) to mean traditional uses of whale products by local aboriginal, indigenous or native communities in meeting their nutritional, subsistence and cultural requirements. The term includes trade in items which are by-products of subsistence catches.

Lose = As defined by the June 2007 Schedule to the International Convention for the Regulation of Whaling, lose means to either strike or take but not to land. (‘Take’ has a distinct meaning in the Marine Mammal Protection Act and International Convention for the Regulation of Whaling.)

Maa-Nulth First Nations = The Maa-nulth First Nations comprise five First Nations from Vancouver Island. They include: Huu-ay-aht First Nations, Ka:’yu:’k’t’h’/Che:k’tles7et’h First Nations, Toquaht Nation, Uchucklesaht Tribe, and the Ucluelet First Nation. Maa-nulth means “villages along the coast” in the Nuu-chah-nulth language. These villages/territories are located on the west coast of Vancouver Island surrounding Barkley Sound and Kyuquot Sound.

Makah Tribal Council = The governing body of the Makah Tribe. In three cooperative agreements with the Makah Tribe (in 1996, 1997, and 2001) the National Oceanic and Atmospheric Administration recognized the Makah Tribal Council as a Native American whaling organization and allowed the Council to issue permits to whaling captains in compliance with the cooperative agreements and Whaling Convention Act regulations.

Makah Whaling Commission = Members of the Makah Tribe that serve to review whaling crew qualifications, identify whaling crew and vessel participation, and provide other hunt restrictions and recommendations. The Makah Tribal Council would issue the permit to a whaling captain before any hunt, based on recommendations from the Makah Whaling Commission.

Maktak = Whale skin and layer of blubber used for food.

Magnuson Stevens Act (MSA) = Also known as the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. A United States law that is the governing authority for all fishery management activities that occur in federal waters within the United States 200 nautical mile limit, or Exclusive Economic Zone. The recent reauthorization mandates the use of annual catch limits and accountability measures to end overfishing, provides for widespread market-based fishery management through limited access programs, and calls for increased international cooperation.

Marine Mammal Commission (MMC) = An independent agency of the United States Government, established under Title II of the Marine Mammal Protection Act. The MMC was created to provide independent oversight of the marine mammal conservation policies and programs being carried out by the federal regulatory agencies. The MMC is charged with developing, reviewing, and making recommendations on domestic and international actions and policies of all federal agencies with respect to marine mammal protection and conservation and with carrying out a research program.

Marine Mammal Protection Act (MMPA) = A United States law that prohibits, with certain exceptions, the take of marine mammals in United States waters and by United States citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States

Maximum Net Productivity Level (MNPL) = A population level related to maximum net productivity, a rate of change defined in the National Marine Fisheries Service's Marine Mammal Protection Act regulations as the greatest net annual increment in population numbers or biomass resulting from additions to the population due to reproduction and/or growth less losses due to natural mortality.

Mitochondrial deoxyribonucleic acid (mtDNA) = DNA that is found in the mitochondria of cells. Unlike nuclear DNA, mtDNA is only inherited through the mother.

Moratorium = See IWC Commercial Whaling Moratorium

Moving Exclusion Zone (MEZ) = As defined in United States Coast Guard regulations, the MEZ is a vessel-based buffer within the Regulated Navigation Area designed to promote the safety of the whaling crew and other persons/watercraft operating in the vicinity of the whaling crew. The MEZ includes the column of water from the surface to the seabed with a radius of 500 yards centered on the Makah whale hunt vessel. Unless otherwise authorized by the Coast Guard, no person or vessel may enter the active MEZ except for an authorized Makah whale hunt and certain authorized media pool vessels.

National Environmental Policy Act (NEPA) = A United States law declaring that it is the continuing policy of the Federal government to use all practicable means to create and maintain conditions under which people and nature can exist in productive harmony and fulfill the social, economic, and other needs of present and future generations of Americans. NEPA provides a mandate and a framework for Federal agencies to consider all reasonably foreseeable environmental effects of their proposed actions and to involve and inform the public in the decisionmaking process.

National Marine Fisheries Service (NMFS) = A United States agency within the National Oceanic and Atmospheric Administration and under the Department of Commerce charged with the stewardship of living marine resources through science-based conservation and management, and the promotion of healthy ecosystems.

National Oceanic and Atmospheric Administration (NOAA) = A scientific agency of the United States Department of Commerce focused on the conditions of the oceans and the atmosphere. NOAA warns of dangerous weather, charts seas and skies, guides the use and protection of ocean and coastal resources, and conducts research to improve understanding and stewardship of the environment. NOAA manages 13 National Marine Sanctuaries, including the Olympic Coast National Marine Sanctuary.

NOAA Office of International Affairs = An office within the National Oceanic and Atmospheric Administration that develops, coordinates, and promotes United States international policies in NOAA-related matters such as ecosystem-based management, climate change, earth observation, and weather forecasting.

Native American whaling organization = As defined by Whaling Convention Act regulations, an entity recognized by NMFS (e.g., the Makah Tribe) as representing and governing the relevant Native American whalers for the purposes of cooperative management of aboriginal subsistence whaling.

Non-binding resolution = A written motion adopted by a deliberative body (e.g., the United States Congress) that does not progress into a law but instead serves to formally express an opinion.

Observer = According to the Makah waiver application, a member of the Makah Department of Fisheries Management whose duties include observing the hunt and photographing any whale landed.

Occipital condyle = Skull bones located at the back and lower part of the cranium near the attachment of the spinal column.

Olympic Coast National Marine Sanctuary (OCNMS) = One of 13 marine sanctuaries in the United States administered by NOAA. It was designated as the first National Marine Sanctuary in the Pacific Northwest in 1994 and encompasses 3,310 square miles off of Washington State's Olympic Peninsula, extending 135 miles along the Washington Coast from about Cape Flattery to the mouth of the Copalis River.

Olympic National Park = A large national park located on Washington's Olympic Peninsula and managed by the United States National Park Service. Originally designated as the Olympic National Monument in 1909, it was re-designated a National Park in 1938 and became a World Heritage Site in 1981.

Optimum sustainable population (OSP) = As defined by regulations implementing the Marine Mammal Protection Act, the term optimum sustainable population means, with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element.

Oregon to Southern Vancouver Island (ORSVI) = An area surveyed for whales within the Pacific Coast Feeding Aggregation survey area and encompassing coastal marine waters from Oregon to southern Vancouver Island, B.C.

Pacific Coast Feeding Aggregation (PCFA) survey area = A coastal marine survey area from northern California to northern Vancouver Island, B.C, used by some foraging gray whales during the summer.

Pacific Fishery Management Council (PFMC) = One of eight regional fishery management councils established by the Magnuson Fishery Conservation and Management Act of 1976 for the purpose of managing fisheries from 3-200 miles offshore of the United States of America coastline. The PFMC is responsible for fisheries off the coasts of California, Oregon, and Washington.

Pelagic = Of or in the upper layers of the open ocean.

Penthrite = Pentaerythritol tetranitrate or PETN. An odorless white crystalline solid used as a powerful explosive. Employed in whale hunting as a "penthrite grenade" discharged from a harpoon cannon.

Petroglyph = An ancient picture or inscription drawn or carved into a rock.

Pilot = According to the Makah waiver application, a member of the whaling crew whose duties include navigating the chase boat.

Plenary session = That portion of the annual International Whaling Commission meeting during which the full body of commissioners (or their deputy/alternate) debate and vote on proposals, resolutions, and motions before the International Whaling Commission.

Plenary power = Complete and unlimited power.

Pods = Small groups of marine mammals, especially whales.

Polychlorinated biphenyls (PCBs) = A class of toxic organic compounds known to accumulate in animal tissue. PCBs were primarily used as cooling and insulating fluids for industrial transformers and capacitors prior to being banned in the United States in the 1970s.

Potential Biological Removal Level (PBR) = As defined by regulations implementing the Marine Mammal Protection Act, the term PBR level means the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population level. The PBR level is the product of the following factors: (1) The minimum population estimate of the stock; (2) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; (3) A recovery factor of between 0.1 and 1.0.

Precedential effects = The effects of an action that would set a precedent for similar actions in the future.

Pupping = To give birth to pup seals or sea lions.

Record of Decision (ROD) = A National Environmental Policy Act document signed by the agency decisionmaker following the completion of an EIS. The ROD contains the decisions, alternatives considered, environmentally preferable alternative(s), factors considered in the agency's decisions, mitigation measures to be implemented; it also indicates whether all practicable means to avoid or minimize environmental harm have been adopted.

Recruitment = The process of adding individual whales to a population, group or area (usually by reproduction but also by migration).

Regulated navigation area (RNA) = As defined in United States Coast Guard regulations, the RNA is a marine zone the United States Coast Guard established within which the Makah whaling crew can activate a MEZ. The RNA promotes the safety of the whaling crew and other persons/watercraft operating in the vicinity of the whaling crew.

Regional Administrator = A National Marine Fisheries Service official who, among other duties, has been delegated authority to make the initial waiver determination under the Marine Mammal Protection Act on the Makah application.

Rifleman = According to the Makah waiver application, a member of the whaling crew whose duties include shooting a harpooned whale using a high-powered rifle.

Rookeries = Sites where seals and sea lions congregate on shore to mate and give birth.

Russian Federation = A federation of independent states in northeastern Europe and northern Asia; formerly the Soviet Union.

Safety officer = According to the Makah waiver application, a member of the whaling crew whose duties include determining when the rifleman or whaler can discharge their weapon.

Salvage = To collect and utilize a dead, unclaimed whale.

Schedule = A document maintained by the International Whaling Convention that governs the conduct of whaling throughout the world. The measures described in the Schedule, among other things, provide for the protection of certain species; designate specified areas as whale sanctuaries in which commercial whaling may not occur if it were to resume; set limits on the numbers and size of whales which may be taken; prescribe open and closed seasons and areas for whaling; and prohibit the capture of suckling calves and female whales accompanied by calves. The compilation of catch reports and other statistical and biological records is also required. The most recent Schedule was amended by the Commission at the 59th Annual Meeting in Anchorage, Alaska, May 28 - 31, 2007.

Scoping = An open process agencies must conduct under the National Environmental Policy Act to determine the range and significance of the issues to be analyzed in depth in an Environmental Impact Statement.

Seabird breeding colonies = Sites at which seabirds congregate to breed (e.g., the numerous islands, rocks, and cliffs along the Washington coast).

Shrapnel = Fragments from an exploded projectile such as a bullet or bomb.

Stinker = As defined by regulations implementing the Whaling Convention Act, stinker refers to a dead, unclaimed whale found upon a beach, stranded in shallow water, or floating at sea.

Stinky whale = Whales that have a strong chemical smell and claimed to be inedible.

Stock = As defined by regulations implementing the Marine Mammal Protection Act, the term stock (or population stock) means a group of marine mammals of the same species or smaller taxa in a common spatial arrangement, that interbreed when mature.

Strike/Struck = As defined by the June 2007 Schedule to the International Convention for the Regulation of Whaling, strike means to penetrate with a weapon used for whaling.

Subsistence catches = A phrase defined by the 1981 *Ad Hoc* Technical Working Group (but not formally adopted by the International Whaling Convention) to mean catches of whales by aboriginal subsistence whaling operations.

Take = As defined by the June 2007 Schedule to the International Convention for the Regulation of Whaling, take means to flag, buoy or make fast to a whale catcher. As defined by the Marine Mammal Protection Act, take means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

Threatened species = As defined in the Endangered Species Act, a threatened species means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Toggle point = A specialized metal point that helps keep a harpoon from slipping out of a struck whale by means of a metal barb that actuates upon penetrating the whale's skin.

Transfer station = A site used to temporarily store refuse prior to transporting it to the end point of disposal or treatment (e.g., a landfill).

Treaty of Neah Bay = The United States government and the Makah Tribe entered into the Treaty of Neah Bay on January 31, 1855. In addition to reserving the right of taking fish at all usual and accustomed grounds and stations, Article IV of the treaty secured the rights of whaling or sealing. The Treaty of Neah Bay is the only treaty between the United States and an Indian tribe that expressly provides for the right to hunt whales.

United States Coast Guard (USCG) = A branch of the United States Department of Homeland Security involved in maritime law, mariner assistance, and search and rescue in America's coasts, ports, and inland waterways as well as international waters with security and economic interests to the United States.

United States Fish and Wildlife Service (FWS) = A bureau within the United States Department of the Interior responsible for enforcing federal wildlife laws, protecting threatened and endangered species, managing migratory birds, restoring nationally significant fisheries, conserving and restoring wildlife habitat such as wetlands, and helping foreign governments with their international conservation efforts. The FWS manages 520 National Wildlife Refuges, including the Washington Islands National Wildlife Refuges.

Usual and accustomed fishing grounds (U&A) = Areas in Washington where tribes have secured treaty rights to fish. The 1855 Treaty of Neah Bay secured these rights (including whaling and sealing rights) for the Makah tribe, and the tribe's U&A fishing grounds were adjudicated in *United States v. Washington*, 626 F.Supp. 1405, 1467 (W.D. Wash. 1985). The boundaries of this U&A include United States waters in the western Strait of Juan de Fuca as well as open ocean areas of the Washington coast north of 48° 02’15” latitude and east of 125° 44’00” longitude.

Washington Islands National Wildlife Refuges = A complex of three National Wildlife Refuges (Flattery Rocks, Quillayute Needles, and Copalis) spanning over 100 miles of Washington's Pacific Coast. Refuge habitat consists of approximately 870 coastal rocks and reefs managed by the United States Fish and Wildlife Service primarily to protect seabird nesting.

Wasteful manner = As defined by regulations implementing the Whaling Convention Act, wasteful manner means a method of whaling that is not likely to result in the landing of a struck whale or that does not include all reasonable efforts to retrieve the whale.

Whale catcher = As defined by the Whaling Convention Act, a whale catcher is a vessel used for the purpose of hunting, killing, taking, towing, holding onto, or scouting for whales. The Makah tribe proposes to employ two types of whale catchers – a paddle-powered canoe(s) and a motorized chase boat.

Whaling captain = As defined by regulations implementing the Whaling Convention Act, a whaling captain or captain means any Native American who is authorized by a Native American whaling organization to be in charge of a vessel and whaling crew.

Whaling Convention Act (WCA) = A United States law that provides the framework for meeting United States obligations arising from the 1946 International Convention for the Regulation of Whaling. It provides for a United States Commissioner to the International Whaling Commission and authorizes the Secretary of State to present objections to that Commission's regulations. It establishes as unlawful whaling, transporting whales or selling whales, in violation of the Convention regulations. It sets up a whaling licensing framework, with fines and imprisonment for violations. Enforcement is primarily the responsibility of the Secretary of Commerce.

Whaling crew = As defined by regulations implementing the Whaling Convention Act, a whaling crew means those Native Americans under the control of a captain. A Makah whaling crew consists of eight Makah tribal members; one serving as captain and the rest as a harpooner and paddlers.

Chapter 1 Purpose and Need

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1.0 PURPOSE AND NEED

1.1 Introduction

1.1.1 Summary of the Proposed Action

The Makah Indian Tribe (Makah or Tribe) proposes to resume limited hunting of eastern North Pacific (ENP) gray whales (*Eschrichtius robustus*; otherwise referred to in this chapter as 'gray whales' and 'whales') in the coastal portion of the Tribe's usual and accustomed fishing grounds (U&A), off the coast of Washington State, for ceremonial and subsistence purposes. The Tribe proposes to harvest up to 20 whales over a five-year period, with no more than five gray whales harvested in any single year. This proposal is in accordance with the current five-year catch limit set by the International Whaling Commission (IWC) for the ENP gray whale stock of 620 whales total, with no more than 140 harvested per year. Both the annual and five-year totals are allocated between the United States and the Russian Federation by a separate bilateral agreement. The Tribe's proposal also includes measures intended to limit the number of whales that may be struck in any year, avoid the intentional harvest of gray whales identified as part of the Pacific Coast Feeding Aggregation (PCFA), limit the annual harvest of PCFA whales based on the abundance of a subset of PCFA whales, ensure that the hunt is as humane as practicable, and protect public safety. This EIS uses the term 'hunt' to include all activities associated with approaching, striking, killing, and landing whales, and the term 'harvest' to mean killing and successfully landing whales.

The 1855 Treaty of Neah Bay expressly secures the Makah Tribe's right to hunt whales. To exercise that right under the Ninth Circuit Court of Appeals decision in *Anderson v. Evans* (2004) however, the Makah must obtain authorization from the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS). Two statutes govern any authorization: the Marine Mammal Protection Act (MMPA) (16 United States Code [USC] 1361 et seq.) and the Whaling Convention Act (WCA) (16 USC 916 et seq.). Specifically, to authorize Makah gray whale hunting, NMFS must perform the following actions:

- Waive the moratorium prohibiting take of marine mammals under Section 101(a)(3)(A) of the MMPA.
- Promulgate regulations implementing the waiver and governing the hunts in accordance with Section 103 of the MMPA.
- Issue any necessary permits to the Makah under Section 104 of the MMPA.

- Enter into a cooperative agreement with the Tribe for co-management of any gray whale hunt and publish any relevant aboriginal subsistence whaling quotas under the provisions of the WCA.

In February 2005 the Makah Tribe formally requested waiver of the take moratorium under the MMPA to hunt gray whales. To assist in its MMPA and WCA determinations, NMFS is preparing this environmental impact statement (EIS) under the National Environmental Policy Act (NEPA) as the lead agency reviewing this action (42 USC 4321 et seq.). See Section 1.2, Legal Framework, for more detail.

Table 1-1 contains certain aspects of the Makah's proposed action, with additional description in Chapter 2, Alternatives.

TABLE 1-1. SUMMARY OF THE MAKAH'S PROPOSED ACTION

Species restrictions	Hunt ENP gray whales only.
Age/sex restrictions	Prohibit hunting of calves or whales accompanied by calves.
Number restrictions	Harvest up to 20 whales in a five-year period, with a maximum of 5 whales harvested, 7 struck, and 3 struck and lost per calendar year.
	Reduce numbers of harvested, struck, and struck and lost whales as necessary in accordance with United States obligations under the International Convention for the Regulation of Whaling (ICRW), or to prevent the ENP gray whale stock from falling below optimum sustainable population (OSP) levels under the MMPA.
	Cease hunting in any year if the number of harvested whales exceeds an allowable bycatch level based on matches in the National Marine Mammal Laboratory's photographic identification catalog for PCFA gray whales.
Area restrictions	Hunt within the coastal portion of the Makah U&A, excluding the Strait of Juan de Fuca.
	Prohibit hunting within 200 yards of Tatoosh Island and White Rock during May to protect nesting seabirds.
Timing restrictions	Prohibit hunting from June 1 through November 30 during any calendar year to avoid intentional harvest of whales feeding off the coast of Washington during the summer feeding period.
Method of hunt restrictions	Hunt using traditional methods, except for the mandatory use of a .50 caliber rifle to kill the whale.
Use restrictions	Limit use of whale products to ceremonial and subsistence purposes.
	Prohibit the commercial sale or offer for sale of any whale products, except for sale or offer for sale of traditional handicrafts made from non-edible whale parts within the United States.

1.1.2 Project Location

The Makah Tribe proposes to resume gray whale hunting in the coastal portion of the Tribe's fishing U&A, as adjudicated by the Western District Court of Washington in *United States v. Washington* (1974 and 1985). The Makah U&A includes marine waters off the northwest coast of Washington State and the western portion of the Strait of Juan de Fuca (Figure 1-1). The Makah's proposed action area (Figure 1-1) is smaller than its adjudicated U&A because the Tribe proposes to exclude the Strait of Juan de Fuca to address concerns about public safety and the effects of hunts on gray whales in the local area.

Figure 1-1 also shows the larger project area, which encompasses the entire Makah U&A and adjacent marine waters, as well as land areas with the potential to be affected by one or more of the project alternatives. The project area includes the following sites:

- Beaches where a gray whale may be landed and butchered
- Rocks and islands of the Washington Islands National Wildlife Refuges within the waters of the Olympic Coast National Marine Sanctuary (OCNMS or Sanctuary), where sanctuary resources such as seabirds and hauled-out marine mammals might be affected
- The Makah and Ozette Reservations and the community of Neah Bay, where many tribal members reside and public services are located
- Other shoreline areas that provide physical or visual access to the Makah's U&A (e.g., vantage points provided by the coastal strip of the Olympic National Park)

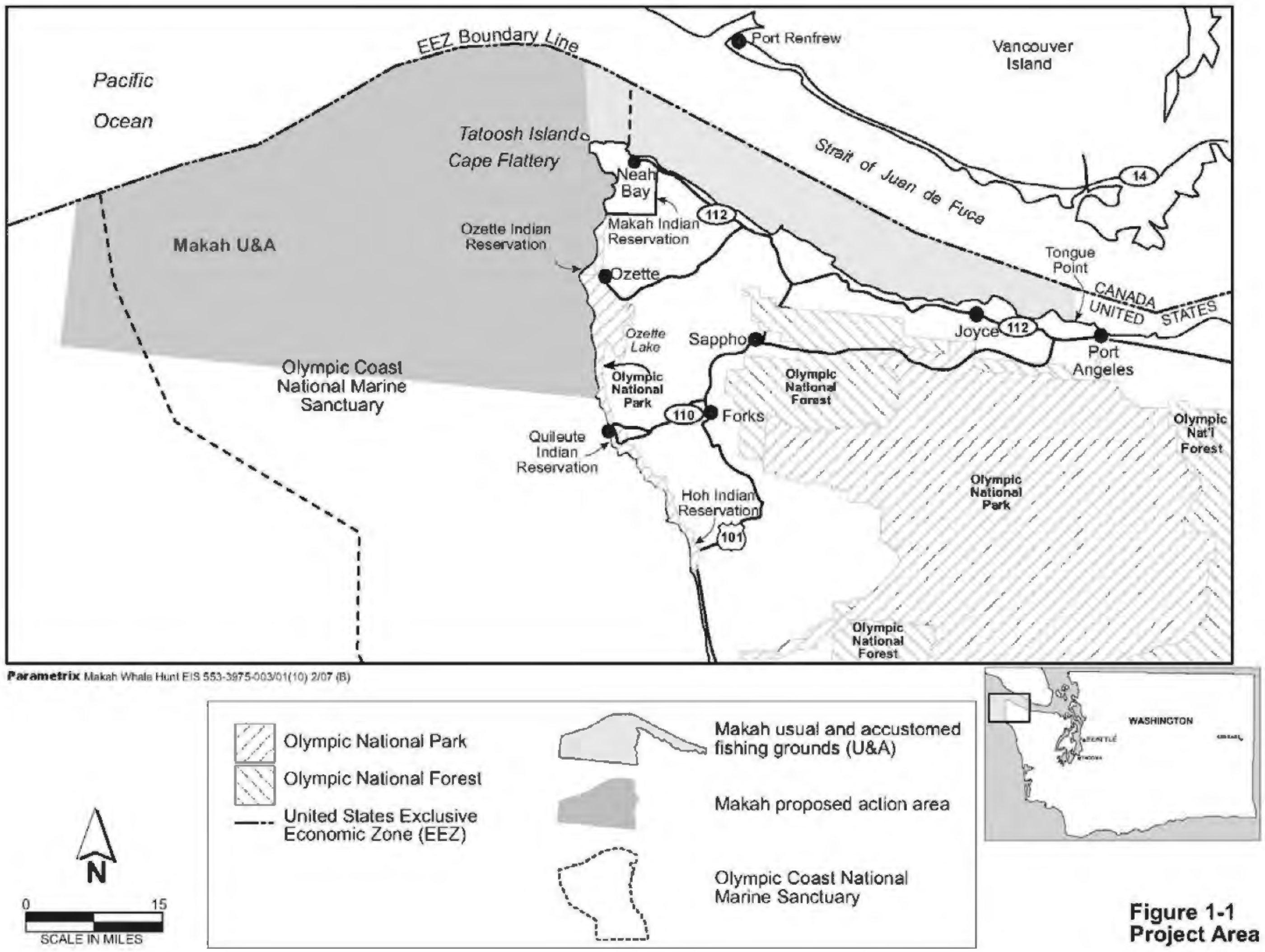

Figure 1-1
Project Area

1.1.3 Summary of Eastern North Pacific Gray Whale Status

The ENP gray whale population migrates along the west coast of North America between Mexico and Alaska and is present year-round in the project area. The population sustained historical aboriginal hunting by natives in present-day Russia, Alaska, British Columbia, and Washington State for many centuries, but commercial whaling in the late 1800s and early 1900s decimated the population. Due to a suite of international and national protections (Section 3.4.3.2.2, Historic Status of the Gray Whale Population, Protection and Recovery after Commercial Exploitation), the population recovered (Rugh et al. 2005). In 1994, ENP gray whales were delisted under the Endangered Species Act (ESA) (59 Federal Register 31094, Jun. 16, 1994). The current estimated population size is approximately 20,110 animals (Rugh et al. 2008). See Section 3.4, Eastern North Pacific Gray Whale, for more information.

1.1.4 Summary of Makah Tribe's Historic Whaling Tradition

The Makah's tradition of whale hunting dates back at least 1,500 years; subsistence use of whale products from drift and stranded whales extends back another 750 years before that time, prior to development of hunting equipment and techniques (Renker 2002). The gray whale was one of the major whale species the Makah hunted due to its predictable near-shore migrations and slow swimming speeds that allowed for approach by canoe (Huelsbeck 1988; Renker 2002).

Whaling provided a food source for the Tribe; oil, blubber, and other products were also important trade goods for barter with other tribes, as well as for commerce with European traders and settlers. Whaling also provided intangible benefits to the Tribe and was a central organizing feature of Makah culture, as evidenced in the religious and social structure (Sepez 2001). The fact that the Treaty of Neah Bay is the only treaty between the United States government and a Native American tribe that specifically protects the right to hunt whales suggests the historic importance of whaling to the Makah Tribe (*Anderson v. Evans* 2004).

A combination of factors led to the suspension of Makah whaling in the 1920s. Commercial whaling decimated the populations of several whale species and drastically reduced the number of whales available to Makah hunters. Smallpox and other infectious diseases reduced the Tribe's numbers, leading to changes in the Tribe's social structure and suppressing family-owned whaling knowledge (Kirk 1986; Renker 2002). Around the same time, the demand for whale oil plummeted (Henderson 1984), and sealing became more profitable than whaling (Kirk 1986). Throughout this time, the United States government attempted to assimilate Native Americans into western society. The government did not provide the assistance for whaling promised in the treaty negotiations, instead encouraging farming practices that ultimately failed due to the nature of the environment; it also banned ceremonial activities related to whaling (Renker 2002) (Section 3.10.3.4.2, Factors Responsible for Discontinuation of the Hunt).

The Makah Tribe formally notified NMFS of its interest in re-establishing limited ceremonial and subsistence whale hunting on May 5, 1995 (Makah Tribal Council 1995a), approximately one year after NMFS removed the ENP gray whale from the endangered species list. Four years later, the Makah hunted and landed one gray whale. Judicial decisions have since prevented the Tribe from hunting gray whales until certain processes are completed. For more information on historic and contemporary Makah whaling, refer to Section 3.10, Ceremonial and Subsistence Resources and the September 2007 unlawful take (Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007).

1.2 Legal Framework

The following section describes the legal framework that will guide NMFS' decisions related to this project, including environmental review under NEPA, the Treaty of Neah Bay and the federal trust responsibility, species protection and conservation under the MMPA, and governance of aboriginal subsistence whaling quotas under the WCA.

1.2.1 National Environmental Policy Act

Congress enacted NEPA to create and carry out a national policy designed to encourage harmony between humankind and the environment. While NEPA neither compels particular results nor imposes substantive environmental duties upon federal agencies (*Robertson v. Methow Valley Citizens Council* 1989), it does require that they follow certain procedures when making decisions about any proposed federal actions that may affect the environment. These procedures ensure that an agency has the best possible information before it to make an informed decision regarding the environmental effects of any proposed action. They also ensure full disclosure of any associated environmental risks to the public. Regulations promulgated by the Council on Environmental Quality (40 CFR [Code of Federal Regulations] 1500-1508) contain specific guidance for complying with NEPA.

Under the Council on Environmental Quality regulations, federal agencies may prepare an environmental assessment (EA) to determine whether a proposed action may have a significant impact or effect on the quality of the human environment. Agencies must examine the context of the action and intensity of the effects to determine the significance of impacts. If information in an EA indicates that the environmental effects are not significant, the agency issues a finding of no significant impact (FONSI) to conclude the NEPA review. NMFS issued FONSIs in two prior NEPA assessments of Makah whale hunting proposals.

NMFS published an EA and FONSI on the first Makah proposal on October 17, 1997 (NMFS 1997), but the Court of Appeals for the Ninth Circuit in *Metcalf v. Daley* (2000) set them aside. Based primarily on the timing of the agency's environmental review, the court held that NMFS had failed to take a hard look at the environmental consequences of the action before making an irreversible commitment to approve the Tribe's proposal. NMFS issued another EA and FONSI on the second Makah whale hunting proposal on July 12, 2001 (NMFS 2001a). The Court of Appeals for the Ninth Circuit in *Anderson v. Evans* (2004) ruled that an EIS, rather than an EA, should have been prepared. The court also stated that the Makah must comply with the process prescribed in the MMPA for authorizing otherwise-prohibited take of marine mammals in order to pursue any treaty rights for whale hunting. The *Anderson v. Evans* (2004) ruling requires NMFS to analyze new issues; informed by that decision, NMFS has prepared this draft EIS. See Section 1.4.3, Other Environmental Assessments and Court Decisions Informing this Action, for more details about prior EAs and court rulings related to this action.

An EIS provides a detailed statement of the environmental impacts of the action, reasonable alternatives, and measures to mitigate adverse effects of the proposed actions. Although the MMPA and NEPA requirements overlap in some respects, the scope of NEPA goes beyond that of the MMPA by considering the impacts of the proposed federal action on non-marine mammal resources such as human health and cultural resources.

An EIS culminates in a Record of Decision (ROD). The ROD documents the alternative selected for implementation, may recommend further review, attaches any conditions that the agency may require, and summarizes the impacts expected to result from the action.

1.2.2 Treaty of Neah Bay and the Federal Trust Responsibility

This section provides a brief history of federal-tribal relations, a general legal description of the treaty rights of the Northwest tribes that evolved from that history, a more specific description of the Makah treaty right to hunt whales, the recent history of the Makah's efforts to use their treaty rights, and the current legal framework for implementation of those rights as defined in the Ninth Circuit Court's decision in *Anderson v. Evans* (2004).

Prior to 1871, the United States government often entered into treaties with Indian tribes, which typically provided for the surrender of large areas of land the Indians occupied to allow for the westward expansion of non-Indians. In exchange, the United States recognized permanent homelands (reservations) and sometimes explicitly or implicitly provided for off-reservation hunting, gathering, and fishing rights. Treaties with Indian tribes are the supreme law of the land and generally preempt state laws. Treaty language securing fishing and hunting rights is not a "grant of rights [from the federal government] to the Indians, but a grant of rights from them — a reservation of those not granted" (*United States v. Winans* 1905). In other words, the tribes retain rights not specifically surrendered to the United States (commonly referred to as reserved rights). The scope of reserved Indian hunting, fishing, and gathering rights that have been recognized by the courts is sometimes very broad and depends on the language of the treaty or the known culture of the tribe at treaty time. Courts have developed rules for interpreting Indian treaties that recognize the communication difficulties between the tribes and treaty negotiators, the imbalance of power between the tribes and the United States, and the fact that the tribes are unlikely to have understood the legal ramifications of the exact wording of their treaties (Cohen 2005). Accordingly, courts liberally construe treaties, resolve ambiguities in the tribe's favor, and "interpret Indian treaties to give effect to the terms as the Indians themselves would have understood them" (*Minnesota v. Mille Lacs Band of Chippewa* 1999).

Seventeen Indian tribes located in western Washington State have treaty-protected and adjudicated fishing rights in the Pacific Ocean, Strait of Juan de Fuca, and Puget Sound. The United States government and the Makah Tribe entered into the Treaty of Neah Bay on January 31, 1855, and the Senate consented to its ratification on March 8, 1859 (United States Statutes at Large, Volume 12, Page 939). In addition to reserving the right of taking fish at all usual and accustomed grounds and stations, Article IV of the treaty secured the rights of whaling or sealing. The Treaty of Neah Bay is the only treaty between the United States and an Indian tribe that expressly provides for the right to hunt whales. At the time of the treaty, gray whale hunting was an integral part of the Tribe's economy and a foundation of the Tribe's unique, maritime-based, indigenous culture.

1.2.2.1 The Stevens Treaties

"To extinguish the last group of conflicting claims to lands lying west of the Cascade mountains and north of the Columbia River, in what is now the State of Washington, the United States entered into a series of treaties with Indian Tribes in 1854 and 1855" (*Washington v. Washington State Commercial Passenger Fishing Vessel Association* 1979). These treaties are called the

Stevens Treaties after Isaac Stevens, the Governor of Washington Territory, who was the United States negotiator. The Stevens Treaties settled the land claims and secured the hunting and fishing rights for numerous tribes, including the Makah Tribe. The promise that the Indian tribes would be guaranteed continued access to a variety of natural resources essential to their livelihood and way of life for future generations was essential for securing Indian consent to the treaties with the United States (*United States v. Washington* 1974). The scope of reserved Indian hunting, fishing, trapping, and gathering rights that courts have recognized depends on the language of the treaty and the circumstances surrounding the treaty negotiations (Section 1.2.2, Treaty of Neah Bay and the Federal Trust Responsibility, for information about how courts interpret treaties).

1.2.2.2 Scope of the Fishing Right under the Stevens Treaties

The fishing clauses of the Stevens Treaties have been at the center of litigation for more than 100 years involving state attempts to limit the exercise of treaty fishing rights. *United States v. Washington* (1974), commonly referred to as the "Boldt" decision, defined the scope of these treaty rights to fish. The court held that state regulation of treaty fishing was authorized only if reasonable and necessary for conservation. In affirming this decision the Supreme Court also interpreted the Stevens Treaties to secure 50 percent of the harvestable surplus of fish passing through their "usual and accustomed grounds and stations" (*United States v. Washington* 1974) to the tribes, unless their moderate living needs could be met by a lesser amount (*Washington v. Washington State Commercial Passenger Fishing Vessel Association* 1979). The Treaty of Neah Bay was one of the Stevens Treaties reviewed in the *United States v. Washington* (1974) litigation. Although the court's focus in that proceeding was to address the appropriate exercise of the Tribe's fishing rights, in reviewing the treaty, the court noted the following:

> [t]he treaty commissioners were aware of the commercial nature and value of the Makah maritime economy and promised the Makah that the government would assist them in developing their maritime industry. Governor Stevens found the Makah not much concerned about their land . . . but greatly concerned about their marine hunting and fishing rights. Much of the official record of the treaty negotiations deals with this. Stevens found it necessary to reassure the Makah that the government did not intend to stop them from marine hunting and fishing but in fact would help them develop these pursuits (*United States v. Washington* 1974).

Additionally, the court noted the following:

> [i]n aboriginal times the Makah enjoyed a high standard of living as a result of their marine resources and extensive marine trade. . . . The Makah not only sustained a Northwest Coast culture, but also were wealthy and powerful as contrasted with most of their neighbors (*United States v. Washington* 1974).

The Court of Appeals for the Ninth Circuit similarly noted that the specific reservation of the right to whale in the Treaty of Neah Bay "suggests the historic importance of whaling to the Makah Tribe" (*Anderson v. Evans* 2004). The Makah U&A for fishing was defined in a later sub-proceeding under *United States v. Washington* (1985).

1.2.2.3 Limitations on the Exercise of Treaty Rights

Treaty rights are not unbounded. The United States Supreme Court has held that the United States Congress has full power over Indian lands and Indian tribes and can abrogate federal Indian treaties (*Lone Wolf v. Hitchcock* 1903) unilaterally, though doing so may implicate Fifth Amendment taking concerns and the need to pay compensation (*Menominee Indian Tribe v. United States* 1968; *Hynes v. Grimes Packing Company* 1949; *United States v. Shoshone Tribe of Indians* 1938). The courts will not lightly find that treaty rights have been abrogated (*Menominee Indian Tribe v. United States 1968*). Generally, states cannot regulate treaty hunting and fishing activities (*Menominee Tribe v. United States* 1968). However, the states of Washington and Oregon have some ability to limit the exercise of Indian treaty rights for conservation purposes where such regulation is necessary to sustain the species.

1.2.2.3.1 <u>State Regulation</u>

In the Pacific Northwest, a significant body of law has developed over the last 40 years in response to state attempts to impose regulations that effectively prevented tribal fishermen from taking fish at their usual and accustomed places. In the 1970s, the United States brought litigation on behalf of the Stevens Treaty tribes against the states of Washington and Oregon to establish the treaty right guarantees of access to the usual and accustomed tribal fishing places and to an equitable share of the harvestable fish. The courts held that states could not qualify the treaty right. In a series of decisions responsive to growing concerns regarding the continued viability of the natural resources in question, however, the Supreme Court affirmed the state's police power to regulate tribal fisheries for conservation purposes where such regulation is necessary to sustain the species. The court stated the following:

> [t]he right to take fish at all usual and accustomed places may, of course not be qualified by the State . . . [b]ut the manner of fishing, the size of the take, the restriction of commercial fishing, and the like may be regulated by the State in the interest of conservation, provided the regulation meets appropriate standards and does not discriminate against Indians (*Puyallup Tribe v. Washington Department of Game* 1968).

In reviewing state conservation regulations, the courts use the conservation necessity principle to ensure that the regulation does not discriminate against the treaty tribe's reserved right to fish, is reasonable and necessary to preserve and maintain the resource, and the conservation required cannot be achieved by restriction of fishing by non-treaty fishermen or by other less restrictive means or methods (*United States v. Washington* 1974). As defined in these court decisions, conservation is a term of art and has been defined alternatively as "those measures which are reasonable and necessary to the perpetuation of a particular run or species of fish" (*United States v. Washington* 1974) and as "preserving a 'reasonable margin of safety' between an existing level of [salmon] stocks and the imminence of extinction…" (*United States v. Oregon* 1983). Although the courts have imposed limits on the nature of state regulation of treaty fishing, they have also held that "neither the treaty Indians nor the state on behalf of its citizens may permit the subject matter of these treaties to be destroyed" (*United States v. Washington* 1975).

1.2.2.3.2 Federal Regulation

Congress exercises plenary power in the field of Indian affairs. As part of this authority, the United States Supreme Court has consistently held that Congress, through the enactment of laws, has the authority to abrogate or modify the exercise of Indian treaty rights. This includes congressional power to abrogate or modify treaty rights through statutes that address conservation of natural resources. To find abrogation, however, the Supreme Court has required "clear evidence that Congress actually considered the conflict between the intended action on the one hand and Indian treaty rights on the other, and chose to resolve the conflict by abrogating the treaty" (*United States v. Dion* 1986). In *Anderson v. Evans* (2004), the court found that the MMPA applies to the Makah Tribe and constrains its treaty right to harvest whales to ensure that "the conservation goals of the MMPA are effectuated." In holding that the MMPA applied to the Tribe, the court stated that "[w]e need not and do not decide whether the Tribe's whaling rights have been abrogated by the MMPA." The court also noted that "[u]nlike other persons applying for a permit or waiver under the MMPA, the Tribe may urge a treaty right to be considered" during review of the Tribe's request (*Anderson v. Evans* 2004).

1.2.2.4 The Federal Trust Responsibility

The United States and Indian tribes have a unique relationship. From the formation of the United States to the present, federal law has recognized Indian tribes as independent political entities with authority over their members and territory (*Worcester v. Georgia* 1832). The United States Constitution provides Congress with the authority to regulate commerce "among the several states, and with the Indian Tribes" (United States Constitution, Article I, Section 8, clause 3). This power to regulate commerce with Indian tribes includes the exclusive authority to enter into treaties and agreements with Indian tribes regarding their rights to aboriginal lands. Central to such treaties and agreements in the Pacific Northwest is the reservation of Indian hunting, gathering, and fishing rights both on and off the reservation. These express and implied reservations preserve the inherent rights of the tribe that have not been limited or abrogated by treaty or federal legislation. The federal government has a trust responsibility to protect the treaty hunting, fishing, and gathering rights of Indian tribes.

As described by the Supreme Court, "under a humane and self-imposed policy which found expression in many acts of Congress and numerous decisions of this Court, [the United States] has charged itself with moral obligations of the highest responsibility and trust" (*Seminole Nation v. United States* 1942).

This unique relationship provides the basis for legislation, treaties, and executive orders that grant unique rights or privileges to Native Americans (*Morton v. Mancari* 1974). The trust responsibility requires federal agencies to carry out their activities in a manner that is protective of these express rights *(Gros Ventre Tribe v. United States* 2006). For example, in cases involving the management of Bureau of Reclamation water projects, the court held that the United States must exercise its discretion for the benefit of Indian tribes (*Pyramid Lake Paiute Tribe of Indians v. Morton* 1973; *Klamath Water Users Protective Association v. Patterson* 2000; *Klamath Drainage District v. Patterson* 2000). Courts have also ruled that the United States has an obligation to ensure that tribal oil and gas lessees obtain the best possible return on leases (*Cheyenne Arapaho Tribes of Oklahoma v. United States* 1992) and to consult with the tribes before taking administrative action that may affect tribal services (*Winnebago Tribe of Nebraska v. Babbitt* 1996).

Executive Order 13175 affirms the trust responsibility of the United States and directs agencies to consult with Indian tribes and respect tribal sovereignty when taking action affecting such rights. This policy is also reflected in the March 30, 1995 document, *Department of Commerce-American Indian and Alaska Native Policy* (United States Department of Commerce 1995). NMFS, as an agent of the federal government, has a trust responsibility to Indian tribes (see, for example, Secretarial Order 3206).

1.2.3 Marine Mammal Protection Act

1.2.3.1 Section 2 – General Purposes and Policies

Congress enacted the MMPA to protect and conserve marine mammals and their habitats. Section 2 of the MMPA contains the general purposes and policies of the Act, including congressional findings (16 USC 1361). Congress was concerned that certain marine mammal species and population stocks were in danger of extinction or depletion, and it intended to establish protections to encourage development of those stocks to the greatest extent feasible, commensurate with sound policies of resource management. Therefore, Congress specified that the primary objective of marine resource management under the MMPA is to maintain the health and stability of the marine ecosystem. Section 2 indicates that stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element of the ecosystem, and they should not be permitted to diminish below their optimum sustainable population (OSP) (Section 3.4.2.1, Marine Mammal Protection Act Management).

1.2.3.2 Section 101(a) – Take Moratorium

To achieve the general purposes and policies of Section 2 of the MMPA, Congress established a moratorium on the taking and importing of marine mammals in Section 101(a) (16 USC 1371(a)). Under the MMPA, 'take' means to "harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 USC 1362(13)). 'Harassment' is defined as follows:

> . . . any act of pursuit, torment, or annoyance which (1) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B Harassment] (16 USC 1362(18)(A)).

This moratorium is not absolute. Statutory exceptions allow marine mammals to be taken for scientific or educational purposes and to be taken incidentally in the course of commercial fishing. A statutory exemption allows take of marine mammals by Alaska Natives for subsistence purposes or to create and sell authentic native articles of handicraft and clothing. The agency may also waive the take moratorium under Section 101(a)(3).

1.2.3.3 Section 101(a)(3)(A) – Waiver of the Take Moratorium

Section 101(a)(3)(A) authorizes and directs the Secretary of Commerce "from time to time" to "determine when, to what extent, if at all, and by what means, it is compatible" with the MMPA "to waive the Section 101(a) take moratorium" (16 USC 1371(a)(3)(A)). NMFS reviews requests to waive the take moratorium on a case-by-case basis, either when a waiver appears appropriate or when a specific proposal is under consideration. NMFS waives the moratorium only with respect to a particular species or stock and then only to the extent provided in the waiver (Bean 1983). As described in Chapter 3, Section 3.17.3.1, Waivers of the MMPA Take Moratorium, the waiver process involves a number of steps, is seldom applied for, and NMFS has not used it many times in its management history.

The following discussion responds to public requests made during the scoping period that NMFS summarize the MMPA procedures for waiving the take moratorium and issuing permits. The primary steps of the MMPA waiver process include (1) initial waiver determination, (2) formal rulemaking on the record (including a hearing before a presiding official, such as an administrative law judge, and proposed regulations), (3) final waiver determination (including final regulations), and (4) permit process. Preparation of this EIS is the first step in a full evaluation of the Makah's request to hunt gray whales; it will aid NMFS in future decisions related to the MMPA (and WCA, discussed in Section 1.2.4, Whaling Convention Act).

1.2.3.3.1 Step 1 — Initial Waiver Determination

NMFS' Northwest Regional Administrator has the delegated authority in this case to make the initial waiver determination. Section 101(a)(3)(A) of the MMPA contains provisions related to the waiver determination. Any waiver determination must fulfill the following criteria:

1. Be based on the best scientific evidence available
2. Be made in consultation with the Marine Mammal Commission
3. Have due regard to the distribution, abundance, breeding habits, and times and lines of migratory movements of the marine mammal stock in question for take
4. Find that the taking is in accord with sound principles of resource protection and conservation as provided in the purposes and policies of the MMPA (Section 2)

Based on these Section 101(a)(3)(A) criteria, the Regional Administrator will make an initial determination whether to waive the moratorium. If the agency ultimately decides not to waive the take moratorium, it would make that decision publicly available in the Federal Register. If the Regional Administrator makes an initial determination to waive the take moratorium, he would propose regulations to govern any take under Section 103. Section 103(a) specifies that regulations must be "necessary and appropriate to [e]nsure that taking will not be to the disadvantage of [the ENP gray whale stock] and will be consistent with the purposes and policies [of the MMPA in Section 2]" (16 USC 1373(a)).

Section 103(b) requires the agency to consider the effect of such regulations on the following:

- Existing and future levels of marine mammal species and population stocks
- Existing international treaty and agreement obligations of the United States
- The marine ecosystem and related environmental considerations

- The conservation, development, and utilization of fishery resources (not applicable in this case)
- The economic and technological feasibility of implementation

Section 103(c) of the MMPA lists allowable restrictions that regulations may include for takes of marine mammals such as the number, age, size, and sex of animals taken, as well as the season, manner, location, and fishing techniques that may be used (for marine mammals caught in fishing gear incidental to fishing activities). Any regulations would be subject to periodic review and modification to carry out the purposes of the MMPA (16 USC 1373(e)).

1.2.3.3.2 Step 2 – Formal Rulemaking on the Record

A preliminary determination to waive must be made on the record after opportunity for an agency hearing; this is a formal rulemaking process detailed in agency regulations at 50 CFR Part 228. Under these provisions, the agency would appoint an officer to preside over the hearing (presiding official). The agency would also publish a notice of hearing in the Federal Register regarding the proposed waiver and proposed regulations.

Among other things, the notice would state the place and date for both a pre-hearing conference and the hearing itself; it would detail how and when to submit direct (written) testimony on the proposed waiver and proposed regulations and how and when to submit a notice of intent to participate in the pre-hearing conference and hearing.

In the notice of hearing, NMFS would also specifically publish the following (among other things):

- The proposed waiver and proposed regulations
- The Regional Administrator's original direct testimony in support of the proposed waiver and proposed regulations (additional direct testimony may be submitted at later times)
- A summary of the statements required by Section 103(d) of the MMPA, including the following:
  - Estimated existing levels of gray whales
  - Expected impact of the proposed regulations on the OSP of the gray whale stock
  - Description of the evidence before the Regional Administrator upon which the proposed regulations would be based
  - Any studies made by or for the Regional Administrator or any recommendations made by or for the agency or the Marine Mammal Commission that relate to the establishment of the proposed regulations

- Issues that may be involved in the hearing
- Any written advice received from the Marine Mammal Commission

The presiding official would examine direct testimony and make a preliminary determination related to the testimonial evidence received. NMFS would make the presiding official's preliminary determination available to the public. After the subsequent pre-hearing conference, the presiding official would decide whether a hearing was necessary. Should the presiding official determine that a hearing was not necessary, the official would publish that conclusion in the Federal Register and solicit written comments on the proposed regulations. After analyzing written comments received, the presiding official would transmit a recommended decision to the NMFS Assistant Administrator.

If, however, the presiding official determined that a hearing was necessary, the official would publish a final agenda for the hearing in the FR within 10 days after the conclusion of the pre-hearing conference. The agenda would list the issues for consideration at the hearing and the parties and witnesses to appear, as well as soliciting direct testimony on issues not included in the notice of hearing. The hearing would then occur at the time and place specified in the notice of hearing, unless the presiding official made changes. The hearing would be a court-like proceeding where witnesses would present direct testimony and be subject to cross-examination from parties (or counsel); oral arguments from the parties (or counsel) might also be given to the presiding official. Interested persons would have another opportunity to comment in writing. After the period for receiving these written briefs expired, the presiding official's recommended decision would be transmitted to NMFS' Assistant Administrator.

1.2.3.3.3 Step 3 ─ Final Waiver Determination

Once the NMFS Assistant Administrator received the presiding official's recommended decision, the agency would publish notice of availability in the Federal Register, send copies of the recommended decision to all parties, and provide a 20-day written comment period. At the close of the 20-day written comment period, the NMFS Assistant Administrator would make a final decision on the proposed waiver and proposed regulations. The final decision may affirm, modify, or set aside (in whole or part) the recommended findings, conclusions, and decision of the presiding official. NMFS would publish the decision in the Federal Register, including a statement containing the history of the proceeding, findings, and rationale on the evidence, as well as rulings. If NMFS' Regional Administrator approved the waiver, the agency would promulgate the final adopted regulations with the decision.

1.2.3.3.4 Step 4 ─ Permit Authorizing Take

Section 104 of the MMPA governs NMFS' issuance of permits authorizing the take of marine mammals. The agency must publish notice of each application for a permit in the Federal Register and invite the submission of written data or views from interested parties with respect to the taking proposed in the application within 30 days after the date of the notice (16 USC 1374(d)(2)). The applicant for the permit must demonstrate that the taking of any marine mammal under such permit will be consistent with the purposes and policies of the MMPA and the applicable regulations established under MMPA Section 103.

If an interested party requests a hearing in connection with the permit within 30 days of publication of the notice, NMFS may afford an opportunity for a hearing within 60 days of the date of the published notice (16 USC 1374(d)(3)). Any applicant for a permit or any party opposed to a permit may obtain judicial review of agency's terms and conditions included the permit, or of the agency's refusal to issue a permit (16 USC 1374(d)(4)). A permit issued under MMPA Section 104 (16 USC 1374(b)) must be consistent with applicable regulations and must specify the following:

- The number and kinds of animals authorized to be taken
- The location and manner (which NMFS must determine to be humane) in which they may be taken
- The period during which the permit is valid
- Other terms or conditions that NMFS deems appropriate

The MMPA defines 'humane' as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved" (16 USC 1362(4)).

1.2.3.4 Application of the MMPA to Makah Whaling

The Court of Appeals for the Ninth Circuit has twice reviewed Makah proposals to exercise the treaty right to hunt gray whales. In the most recent decision, the court held that the permit and waiver provisions of the MMPA must be satisfied before NMFS can authorize the hunt (*Anderson v. Evans* 2004). Relying on the "principles embedded in the Treaty of Neah Bay, itself," the court framed the issue for decision as "whether restraint on the Tribe's whaling pursuant to treaty rights is necessary to effectuate the conservation purpose of the MMPA" (*Anderson v. Evans* 2004). The court defined the conservation purpose of the MMPA as "to ensure that marine mammals continue to be significant functioning element[s] in the ecosystem" and not "diminish below their optimum sustainable population" (*Anderson v. Evans* 2004).

Specifically, the court stated the following:

> . . . [t]o carry out these conservation objectives, the MMPA implements a sweeping moratorium in combination with a permitting process to ensure that the taking of marine mammals is specifically authorized and systematically reviewed. For example, the MMPA requires that the administering agency consider "distribution, abundance, breeding habits, and times and lines of migratory movements" when deciding the appropriateness of waiving requirements under the MMPA, 16 USC. Section 1371 (a)(3)(A). And, when certain permits are issued, the permit may be suspended if the taking results in "more than a negligible impact on the species or stock concerned" (16 USC Section 1371 (a)(5)(B)(ii)). One need only review Congress's carefully selected language to realize that Congress's concern was not merely with survival of marine mammals, though that is of inestimable importance, but more importantly with ensuring these that these mammals maintain and remain significant functioning elements in the ecosystem. The MMPA's requirements for taking are specifically designed to promote such objectives. Without subjecting the tribe's whaling to review under the MMPA, there is no assurance that the takes by the tribe of gray whales, including both those killed and those harassed without success, will not threaten the role of gray whales as functioning elements of the marine ecosystem, and thus no assurance that the purposes of the MMPA will be effectuated (*Anderson v. Evans* 2004).

Additionally, the court stated the following:

> . . . [h]ere the purpose of the MMPA is not limited to species preservation. Whether the Tribe's whaling will damage the delicate balance of the gray whales in the marine ecosystem is a question that must be asked long before we reach the desperate point where we face a reactive scramble for species preservation. (*Anderson v. Evans* 2004).

The court found these principles "embedded in the Treaty of Neah Bay" and Supreme Court precedents and stated the following:

> . . . [j]ust as treaty fisherman are not permitted to totally frustrate . . . the rights of non-Indian citizens of Washington to fish . . . the Makah cannot consistent with the plain terms of the treaty, hunt whales without regard to processes in place and designed to advance conservation values by preserving in marine mammals or to engage in whale watching, scientific study, and other non-consumptive uses. (*Anderson v. Evans* 2004).

The court noted that in requiring compliance with the MMPA, "we do not purport to address what limitations on the scope of a permit, if any is issued, would be appropriate." Further, in recognition of the Tribe's unique status the court stated, "[u]nlike other persons applying for a permit or waiver under the MMPA, the Tribe may urge a treaty right to be considered in the NMFS's review of an application by the Tribe under the MMPA" (*Anderson v. Evans* 2004). The

Makah Tribe has informed NMFS that it believes that the Treaty of Neah Bay bars NMFS from denying the Tribe's MMPA application where tribal whaling can be accomplished in a manner consistent with the conservation purposes of the MMPA. According to the Tribe, this means that the whaling would not cause the ENP stock of gray whales to fall below its optimum sustainable population or to cease to be a significant functioning element of the marine ecosystem (Makah Tribe 2005a; Makah Tribe 2006a). Furthermore, the Tribe contends that NMFS may not impose restrictions on the exercise of the Tribe's whaling right, beyond those the Tribe itself proposed in its MMPA waiver and permit application, unless NMFS shows such restriction to be necessary to achieve the MMPA's conservation purpose (Makah Tribe 2005a; Makah Tribe 2006a). The Tribe believes that its application is conservative and fully consistent with the conservation purpose of the MMPA (Makah Tribe 2005a; Makah Tribe 2006a).

1.2.4 Whaling Convention Act

Congress enacted the WCA to implement the domestic obligations of the United States government under the International Convention for the Regulation of Whaling (ICRW). This EIS analyzes NMFS' domestic authority and responsibilities under the WCA, but it does not analyze the position of the United States as a political body in the international arena. The EIS does, however, describe international whaling governance under the ICRW to provide context for the WCA statutory and regulatory framework and particularly to address issues raised in public comments.

1.2.4.1 International Whaling Governance under the ICRW

The ICRW is an international treaty signed on December 2, 1946, to "provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry" (ICRW, Dec. 2, 1946, 161 United Nations Treaty Series 72). The United States was an original signatory to the ICRW in 1946. A focus of the ICRW was the establishment of the IWC. Functions and operating procedures of the IWC, the IWC's moratorium on commercial whaling, aboriginal subsistence whaling under the IWC, and the United States' preparation for the IWC, are described below.

1.2.4.1.1 <u>Functions and Operating Procedures of the IWC</u>

The IWC is an international organization whose membership consists of one commissioner from each contracting government. Under Article V.1 of the ICRW, the IWC's charge is to adopt regulations for the conservation and utilization of whale resources by periodically amending the

Schedule, a document that is an integral part of the ICRW. IWC regulations adopted in the Schedule may do the following:

- Designate protected and unprotected species
- Open and close seasons and waters
- Implement limits on the size of whales taken, and on the time, method, and intensity of whaling
- Specify gear, methods of measurement, catch returns and other statistical and biological records, and methods of inspection for the stocks of large cetaceans under IWC jurisdiction (i.e., baleen and sperm whales)

The IWC seeks to reach consensus on Schedule amendments. When consensus is not possible, a three-fourths majority of all who voted may amend the Schedule (each contracting government has one vote).

Article V.2(b) of the ICRW specifies that amendments to the Schedule must be based on scientific findings. The IWC established the Scientific Committee, consisting of approximately 200 of the world's leading whale biologists, to provide advice on the status of whale stocks. The Scientific Committee meets annually in the two weeks immediately preceding the main IWC meeting. It may also call special meetings as needed to address particular subjects during the year.

Article V.3 of the ICRW governs the procedure for amending the Schedule, including application of IWC whaling regulations. In general, amendments to the Schedule are effective 90 days after the IWC notifies each contracting government of the amendment, unless a contracting government objects. If an objection occurs, the objector and other contracting governments have a certain period to present objections to the IWC. After that period expires, the amendment is effective with respect to all contracting governments that have not presented objections, but it is not effective for the objector(s) until the objection is withdrawn. A contracting government may use this procedure when it considers its national interests or sovereignty unduly affected.

1.2.4.1.2 IWC Commercial Whaling Moratorium

The IWC initially focused on regulation of the commercial whaling industry. In 1982, the IWC approved a moratorium on all commercial whaling in paragraph 10(e) of the Schedule, effectively expanding the 1937 ban on commercial harvest of gray whales and right whales to all large whale species. The commercial whaling moratorium is still in place for all non-objecting parties. Iceland, Norway, and the Russian Federation lodged objections that are currently effective, so the moratorium does not apply to those countries. Paragraph 10(e) also states that the commercial whaling moratorium "will be kept under review, based upon the best scientific advice," and that "the [IWC] will undertake a comprehensive assessment of the effects of [the commercial whaling moratorium] on whale stocks and consider modification of this provision and the establishment of other catch limits" (IWC Schedule 2006). The IWC has been developing a revised management scheme (a management plan for commercial whaling) for the last several years, but has made little progress on its adoption. There is active debate at the IWC about the sustainability of whale stocks, the appropriateness of maintaining the ban on all commercial whaling, and the type and level of supervision of commercial whaling should it resume.

1.2.4.1.3 IWC Aboriginal Subsistence Whaling

The IWC recognizes a distinction between whaling for commercial purposes and whaling by aborigines for subsistence purposes — aboriginal exceptions were incorporated into predecessor treaties to the ICRW and have been a part of the whaling regime under the ICRW since the time of the first Schedule (as used in this EIS, the term 'aborigines' refers to indigenous peoples). The IWC governs aboriginal subsistence whaling by setting catch limits for certain whale stocks in the Schedule, after considering requests from contracting governments and/or after consulting with the Scientific Committee. The first gray whale catch limits were set in 1979. When contracting governments make requests to the IWC to set catch limits in the Schedule, they are acting on behalf of aborigines in their respective nations, and they submit a proposal to the IWC based on cultural and nutritional needs documented in a needs statement). At the 1994 annual meeting, the IWC formally adopted Resolution 1994-4 to reaffirm three broad objectives for evaluating such requests from contracting governments:

- To ensure that the risks of extinction to individual stocks are not seriously increased by subsistence whaling
- To enable aboriginal people to harvest whales in perpetuity at levels appropriate to their cultural and nutritional requirements, subject to the other objectives
- To maintain the status of whale stocks at or above the level giving the highest net recruitment and to ensure that stocks below that level are moved towards it, so far as the environment permits

The IWC sets catch limits for each whale stock generally in five-year increments and subject to annual review. These catch limits are contained in paragraph 13 of the Schedule. The WCA defines aboriginal subsistence whaling as whaling authorized by paragraph 13 of the Schedule annexed to and constituting a part of the ICRW (50 CFR 230.2). The Schedule does not otherwise define aboriginal subsistence whaling, but delegates adopted the following definition of subsistence use by consensus at the 2004 annual meeting of the IWC:

- The personal consumption of whale products for food, fuel, shelter, clothing, tools, or transportation by participants in the whale harvest.
- The barter, trade, or sharing of whale products in their harvested form with relatives of the participants in the harvest, with others in the local community or with persons in locations other than the local community with whom local residents share familial, social, cultural, or economic ties. A generalized currency is involved in this barter and trade, but the predominant portion of the products from each whale are ordinarily directly consumed or utilized in their harvested form within the local community.
- The making and selling of handicraft articles from whale products, when the whale is harvested for the purposes defined in (1) and (2) above.

General principles governing aboriginal subsistence whaling are contained in paragraph 13(a) of the Schedule, and specific catch limits for aboriginal subsistence use are set under paragraph 13(b) of the Schedule. Paragraph 13(a) of the current Schedule includes the 13(a)(4) prohibition on the "strik[ing], tak[ing] or kill[ing] calves or any whale accompanied by a calf," and the 13(a)(5) requirement that "all aboriginal whaling shall be conducted under national legislation that accords with paragraph 13 of the Schedule" (IWC Schedule 2006). Paragraph 13(a)(5) is a recent modification to the Schedule, adopted by consensus during the 2004 IWC plenary session. The language was moved from the more specific provisions in 13(b) to the more general provisions in 13(a). The modification is consistent with Article V.2(c) of the ICRW, which specifies that the IWC may not set catch limits for any particular nationality (e.g., specified native peoples) or group of whalers (i.e., individual whaling operations). Native peoples engaging in subsistence hunts do so under permit issued by their governments. In the United States, the WCA provides the mechanism for implementing the catch limits set in the IWC Schedule.

Paragraph 13(b) of the current schedule (IWC Schedule 2007) sets the following catch limits for 2008 through 2012:

- Aborigines taking bowhead whales from the Bering-Chukchi-Beaufort Seas stock (paragraph 13(b)(1))
- Aborigines, or a Contracting Government acting on behalf of aborigines, taking gray whales from the Eastern stock in the North Pacific (paragraph 13(b)(2))

- Aborigines taking minke whales from the West Greenland and Central stocks, fin whales from the West Greenland stock, and bowhead whales from the West Greenland feeding aggregation[1] (paragraph 13(b)(3))
- The Bequians of St. Vincent and the Grenadines taking humpback whales (Explanatory Notes to the Schedule indicate that the 'Bequians' are specifically named in paragraph 13(b)(4) for geographical purposes alone, so as not to be in contravention of Article V.2(c) of the ICRW, which prohibits naming of particular groups of whalers)

Paragraph 13(b)(2) sets a catch limit of 620 ENP gray whales, limited to 140 whales per year (reviewable annually by the IWC and its Scientific Committee), to "aborigines or a Contracting Government on behalf of aborigines . . . only when the meat and products of such whales are to be used exclusively for local consumption and distribution." The IWC set this catch limit for the ENP gray whale stock after receiving and considering a joint request from the United States and the Russian Federation to revise such a catch limit in the Schedule. By a bilateral agreement between the United States and the Russian Federation, the ENP gray whale catch limit is allocated as 20 whales (up to five per year) for the Makah, and 600 whales (up to 135 per year) for the Chukotka Natives. The IWC does not have a formal definition of aboriginal use of whale products for 'local consumption and distribution.' NMFS interprets the IWC's 2004 'subsistence use' definition and the current Schedule regarding local distribution as proposed by the Makah to mean that the Makah could share whale products from any hunt within the borders of the United States with the following:

- Relatives of participants in the harvest
- Others in the local community (both non-relatives and relatives)
- Persons in locations other than the local community with whom local residents share familial, social, cultural, or economic ties

1.2.4.1.4 United States' IWC Interagency Consultation

The United States, as a contracting government to the ICRW, recognizes the IWC as the global organization with the authority to manage whaling. The United States negotiating positions at the IWC are advanced by the United States Commissioner to the IWC; the United States Commissioner is appointed by the President and serves at his pleasure. The United States Commissioner is not a federal agency. Negotiating positions advocated by the United States

[1] The annual quota from this feeding aggregation shall only become operative when the Commission has received advice from the Scientific Committee that the strikes are unlikely to endanger the stock. (paragraph 13 (b)(3) (iv).

Commissioner on behalf of the United States are not final agency actions; these positions may change during the negotiations. The United States' negotiating positions advocated before the IWC, moreover, may or may not be adopted by the IWC, and any attempt to analyze effects on the human environment would be speculative.

The United States nevertheless conducts both an internal and public review of whaling issues before making any requests to revise catch limits in the Schedule. When the United States receives a request (needs statement) from a Native American tribe to whale for subsistence purposes, NOAA's Office of International Affairs, the United States Commissioner to the IWC, and the Department of State first review the needs statement. The United States Commissioner may also consult with other federal agencies as appropriate. Before each annual IWC meeting, the United States Commissioner presents the draft United States position on whaling issues, including proposals to revise aboriginal subsistence whaling catch limits, to the public at the IWC Interagency Committee meeting. These interagency meetings take place at least once a year in the Washington D.C. area, and they are open to any United States citizen with an interest in whaling, except for individuals representing foreign interests. Representatives of environmental and animal rights groups, Native American groups, sustainable use groups, and other concerned citizens typically attend. When relevant, Makah whaling issues have been discussed at public IWC Interagency meetings since May of 1995. In each case, attendees have reviewed and commented on the draft United States position at the IWC related to requesting revisions of catch limits in the Schedule.

1.2.4.2 National Whaling Governance under the WCA

1.2.4.2.1 United States' Acceptance or Rejection of IWC Regulations

Congress enacted the WCA to implement the domestic obligations of the United States under the ICRW. Under Section 916b of the WCA, the Secretary of State (with concurrence by the Secretary of Commerce) has the vested power to present or withdraw objections to regulations of the IWC on behalf of the United States as a contracting government. See Section 1.2.4.1.1, Functions and Operating Procedures of the IWC, for more information.

1.2.4.2.2 National Prohibition of Commercial Whaling

The United States was a party to the 1937 Agreement that banned commercial whaling of gray whales. The United States was also instrumental in urging the IWC to adopt the 1982 moratorium on commercial whaling of all species (commercial whaling of all species in the United States has been prohibited nationally since 1971). The United States remains opposed to commercial whaling.

1.2.4.2.3 National Aboriginal Subsistence Whaling

The Secretary of Commerce holds general powers, currently delegated to NMFS, to administer and enforce whaling in the United States, including adoption of necessary regulations to carry out that authority. The regulations prohibit whaling, except for aboriginal subsistence whaling, which is defined as "whaling authorized by paragraph 13 of the [IWC] Schedule" (50 CFR 230.2). NMFS publishes aboriginal subsistence whaling quotas set in accordance with paragraph 13 of the Schedule in the Federal Register, together with any relevant restrictions, and incorporates them into cooperative management agreements with tribes (50 CFR 230.6(a)).

NMFS may not necessarily publish a quota, even where an IWC catch limit is set for a particular stock. In 2000 and 2001, for instance, NMFS did not publish available quotas for ENP gray whales for the Makah during portions of the 1998 through 2002 five-year period due to litigation (nor has NMFS issued a quota for the 2008 quota period). To authorize the proposed Makah whale hunting, NMFS would have to publish an aboriginal subsistence whaling quota in the Federal Register annually for the Makah's use. NMFS would also have to enter into a cooperative management agreement with the Makah Tribe. Publication of any of the quota for 2008 through 2012, as well as consideration of any cooperative management agreement with the Tribe, is contingent upon completion of this NEPA review and the MMPA formal rulemaking procedures described above. Any published quotas are allocated to each whaling village or tribal whaling captain by the appropriate Native American whaling organization (entities recognized by NMFS as representing and governing the relevant Native American whalers for the purposes of cooperative management of aboriginal subsistence whaling).

WCA regulations track the IWC provisions that prohibit whaling of any calf or whale accompanied by a calf (50 CFR 230.4(c)). They also prohibit any person from selling or offering for sale whale products from whales taken in aboriginal subsistence hunts, except that authentic articles of native handicrafts may be sold or offered for sale (50 CFR 230.4(f)). Regulations also require that whaling not be conducted in a wasteful manner (50 CFR 230.4(k)), which means a method of whaling that is not likely to result in the landing or a struck whale or that does not include all reasonable efforts to retrieve the whale (50 CFR 230.2).

The WCA and its implementing regulations require licensing and reporting. No one may engage in aboriginal subsistence whaling except a whaling captain or a crewmember under the whaling captain's control. Whaling captains are identified by the relevant Native American whaling organization, which must provide evidence or an affidavit that the whale catcher (i.e., vessel) is adequately supplied and equipped and has an adequate crew (WCA Section 916d(d)(1) and 50 CFR 230.4(d)). The license may be suspended if the whale captain fails to comply with WCA regulations (50 CFR 230.5(b)). If any tribe salvages a stinker (a dead, unclaimed whale found upon a beach, stranded in shallow water, or floating at sea, 50 CFR 230.2), it must provide NMFS with an oral or written report describing the circumstances of the salvage within 12 hours of the event (50 CFR 230.7). No person may receive money for participation in aboriginal subsistence whaling (WCA Section 916d(d) as implemented through 50 CFR 230.4(e)). The whaling captain and Native American whaling organization are also responsible for reporting the number, dates, and locations of strikes, attempted strikes, or landings of whales, including certain data from landed whales, to NMFS (50 CFR 230.8).

1.2.4.3 Application of the WCA to Makah Whaling

The United States seeks IWC approval of an appropriate catch limit before authorizing any authorization of aboriginal subsistence whaling under the WCA (NMFS 2001a).

The Makah Tribe believes that the United States' obligation to the Makah Tribe takes precedence over United States obligations under the ICRW (Makah Tribe 2005a). Although the Makah Tribe does not believe that the Makah subsistence harvest requires IWC approval, the Tribe has worked cooperatively with the United States government to obtain that approval. At the IWC's annual meeting held in May 2007, the IWC approved by consensus an aboriginal subsistence whaling catch limit of 620 gray whales for the 2008 through 2012 five-year period, limited to a maximum of 140 takes (i.e., lethal takes) per year. The catch limit was based on the joint request of the United States and the Russian Federation. A bilateral agreement between the United States and the Russian Federation allocates the catch limit for the stock as follows: 20 whales over the five-year period, with a maximum of five whales per year, on behalf of the Makah, and 600 whales over the five-year period, with a maximum of 135 whales per year, on behalf of the Chukokta Natives. The United States currently holds the aboriginal subsistence whaling quota for the ENP gray whale stock on behalf of the Makah, but NMFS has not published it in the Federal Register due to the pending regulatory processes described in this EIS.

1.3 Purpose and Need for Action

1.3.1 Purpose for Action

The purpose for this action is for NMFS to respond to the Makah's request to hunt ENP gray whales for ceremonial and subsistence purposes. If NMFS authorizes the Makah to hunt gray whales, the combined regulatory actions (i.e., MMPA waiver of the take moratorium, promulgation of regulations, and issuance of any necessary permits, plus WCA publication of a quota and execution of a cooperative management agreement) would authorize the Makah to kill up to an approved number of gray whales that would not exceed any annual or five-year IWC catch limits. The Makah Tribe's purpose is to resume its traditional hunting of gray whales under its treaty right. Chapter 2, Alternatives, contains additional details of the proposed action.

1.3.2 Need for Action

The need for this action is for NMFS to address federal trust responsibilities to the Makah, particularly with respect to the Tribe's reserved whaling rights under the Treaty of Neah Bay, and to comply with the requirements of the MMPA and the WCA. Under the MMPA, NMFS must protect and conserve the gray whale population; under the WCA, the agency must regulate whaling in accordance with the ICRW and IWC regulations. The Makah's need for the action is to exercise its treaty whaling rights to provide a traditional subsistence resource to the community and to sustain and revitalize the ceremonial, cultural, and social aspects of its whaling traditions.

1.3.3 Decisions to be Made

NMFS is conducting this environmental review under NEPA as a first step in the full evaluation of the Makah's proposal to hunt gray whales. This EIS evaluates the effects of the proposed action and five alternative actions (including the No-action alternative) on the human (including social and biological) environment, as well as suitable mitigation measures. By examining the impacts of the proposed action and a full range of alternatives, the EIS will provide information key to making decisions relevant to the Tribe's proposed action, such as the following:

- Degree of conservation impacts to the gray whale population and the local marine ecosystem
- Degree of impacts to the Makah Tribe
- Degree of other impacts to the local environment, such as public safety, aesthetics, public sentiment regarding whales, and tourism/whale-watching

1.4 Background and Context

1.4.1 Summary of Aboriginal Subsistence Whaling Catch Limits

1.4.1.1 Worldwide Catch Limits

Before 1976, the IWC provided a blanket exemption for aboriginal subsistence whaling. Since 1976 (and 1979 for gray whales), the relevant provisions of the IWC Schedule addressing aboriginal subsistence whaling are in paragraph 13. Paragraph 13(a)(5), in particular, provides that "all aboriginal whaling shall be conducted under national legislation that accords with this paragraph." The IWC has regulated aboriginal subsistence whaling through catch limits set under paragraph 13(b) of the Schedule. These limits include the following stocks:

- Bering-Beaufort-Chuckchi Seas stock of bowhead whales (the stock of interest to Alaska Natives and Chukotka Natives under management control of the United States and the Russian Federation, respectively)
- ENP gray whale stock (the stock of interest to the Makah Tribe and Chukotka Natives under management control of the United States and the Russian Federation, respectively)
- West Greenland and Central Stocks of minke whales, West Greenland stock of fin whales and a West Greenland bowhead feeding aggregation (stocks of interest to the Greenlanders under control of Denmark)
- North Atlantic humpback whales (stocks of interest to the Bequians, under control of St. Vincent and the Grenadines)

Canada's First Nation members have also harvested bowhead whales, but they are not currently operating under IWC catch limits set in the Schedule, because Canada is not a party to the ICRW. Maa-Nulth First Nations on Vancouver Island made an agreement with the Canadian government in December 2006 to forgo their traditional right to hunt gray whales for at least 25 years, in exchange for land, a share of mineral and timber resources on that land, and a cash settlement (CBC News 2006; Indian and Northern Affairs 2006).

Chapter 3.17.3.2.3, Aboriginal Subsistence Whaling, provides more detail about aboriginal subsistence whaling, including the contracting governments' reported number of whales harvested.

1.4.1.2 United States Catch Limits

The United States has requested that the IWC revise catch limits in the Schedule on behalf of two native groups: the Alaska Eskimos and the Makah Tribe. The Eskimos and the Makah are the only two native groups in the United States that have asked the government to request revisions to catch limits in the Schedule from the IWC on their behalf. The Eskimos, as Alaska Natives, are exempt from the MMPA take moratorium under Section 101(b), and the Makah hold the only treaty right referring expressly to whaling.

1.4.1.2.1 <u>Relevant Overview of Requests for Bowhead Whales on Behalf of Alaska Eskimos</u>

Relevant information about United States' requests for bowhead whale catch limits on behalf of the Alaska Eskimos is presented here, because the history gives context to the current IWC process described above in Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling. Like Makah hunting of gray whales, Eskimos have hunted bowhead whales as an important species for subsistence and for social and cultural purposes for at least 2,000 years (Stoker and Krupnik 1993). Hunting bowhead whales in Alaska remains a communal activity that supplies meat and 'maktak' (whale skin and layer of blubber that is used for food) for the entire community, as well as for feasts and during annual celebrations. Formalized patterns of hunting, sharing, and consumption characterize the modern bowhead hunt. The bowhead hunt is the principal activity through which younger generations learn traditional skills for survival in the Arctic. It also provides ongoing reinforcement of the traditional social structure. In addition to being a major source of food, the bowhead subsistence hunt is a large part of the cultural tradition of these communities and helps define their modern cultural identity (Braund et al. 1997).

Since 1976, the United States, on behalf of the Alaska Eskimos, has requested that the IWC revise the bowhead catch limits in the Schedule, and the IWC has set catch limits for the bowhead whale stock in the Schedule after considering the nutritional and cultural need for bowhead whales by Alaska Eskimos and the level of harvest that is sustainable. The United States and the Russian Federation share a quota based on the IWC catch limits for the Western Arctic bowhead stock, approved at the annual meeting of the IWC in June of 2007 for the 2008 through 2012 five-year period. The catch limit is allocated between the United States and the Russian Federation through a bilateral agreement.

Due to some controversy and negotiations about appropriate catch limits for Alaska Eskimo bowhead hunts in 1977 and 1978, a meeting of experts on wildlife science, nutrition, and cultural anthropology convened in Seattle from February 5 to 9, 1979 (the experts in cultural anthropology convened for this meeting were known as the Cultural Anthropology Panel). Their charge was to examine the Alaska Eskimo bowhead harvest, provide data, and develop them for an IWC Technical Committee examining the aboriginal subsistence whaling processes. The Cultural Anthropology Panel at that meeting developed a working definition of subsistence use

(IWC 1979a), a term not defined in the ICRW or the Schedule. Delegates to the 2004 annual meeting of the IWC subsequently adopted the working definition of subsistence use by consensus (Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling). A subsequent working group convened in 1981 (the *Ad Hoc* Technical Working Group on Development of Management Principles and Guidelines for Subsistence Catches of Whales by Indigenous [Aboriginal] Peoples) agreed to the following working definition of aboriginal subsistence whaling and related concepts (IWC 1982):

- *Aboriginal subsistence whaling* means whaling, for purposes of local aboriginal consumption carried out by or on behalf of aboriginal, indigenous, or native peoples who share strong community, familial, social and cultural ties related to a continuing traditional dependence on whaling and the use of whales.
- *Local aboriginal consumption* means that traditional uses of whale products by local aboriginal, indigenous or native communities in meeting their nutritional, subsistence and cultural requirements. The term includes trade in items which are by-products of subsistence catches.
- *Subsistence catches* are catches of whales by aboriginal subsistence whaling operations.

While the IWC has not formally adopted the 1981 Ad Hoc Technical Working Group's definition of aboriginal subsistence whaling, it did adopt a definition of subsistence use in 2004 (Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling). The same 1981 Ad Hoc Technical Working Group also developed three broad objectives for the IWC to use when evaluating aboriginal subsistence whaling proposals from contracting governments. The IWC did formally adopt these three principles in Resolution 1999-4, detailed above in Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling.

1.4.1.2.2 Overview of Requests for ENP Gray Whales on Behalf of the Makah

On May 5, 1995, approximately a year after the ENP gray whale was removed from the endangered species list, the Makah Tribal Council formally notified NMFS of its interest in reestablishing ceremonial and subsistence hunts for gray whales (Makah Tribal Council 1995a). The Tribe anticipated harvesting only one or two whales initially, but included five as the maximum extent of the yearly harvest, if it determined that it could use additional whales effectively and allocate them to each of five ancestral villages (Makah Tribal Council 1995a). The Makah agreed not to sell whale meat commercially, developed a comprehensive needs statement, and entered into a cooperative management agreement with NMFS to manage the whale hunt. At the 1995 annual meeting of the IWC, the United States did not request that the

IWC revise the Schedule to set a catch limit for the ENP gray whale stock, but informed the IWC that it intended to submit a formal proposal on the Makah's behalf in the future (IWC 1996).

At the annual meeting of the IWC in 1996, the United States acted on the Makah's behalf and made a request that the IWC revise the Schedule to set a catch limit for the ENP gray whale stock, requesting up to five ENP gray whales per year from 1997 through 2000. At both the Aboriginal Subsistence Whaling Subcommittee and IWC plenary meetings, many delegates supported the United States' request. Other delegates indicated they would vote against the proposal. One reason given for this opposition was that the United States did not ask the Russian Federation to share the existing 1995 to 1997 catch limit of 140 ENP gray whales per year, which was based on the cultural and nutritional needs of the Chukotka Natives (IWC 1997; 63 FR 16701, April 6, 1998). Instead, the United States adhered to a prior position that each contracting government requesting a revision to the Schedule for aboriginal subsistence whaling catch limits must submit its own proposal before the IWC (IWC 1997; 63 FR 16701, April 6, 1998). Opponents noted that granting the United States request would increase the total ENP gray whale catch limit beyond what had already been set by the IWC in paragraph 13(b)(2) of the Schedule (IWC 1997). At the 1996 meeting, the Russian Federation had also requested a catch limit of five bowhead whales a year, but withdrew its request when a consensus could not be reached among delegates. The bowhead stock catch limit was already set for the United States and was not shared with Russia (IWC 1997).

Another reason for the opposition was that some delegates questioned whether the Makah had a "continuing traditional dependence" on whaling (IWC 1997), a component of the working definition for aboriginal subsistence whaling developed by the 1981 Ad Hoc Technical Working Group (Section 1.4.1.2.1, Relevant Overview of Requests for Bowhead Whales on Behalf of Alaska Eskimos). The delegates noted that the Makah had not hunted gray whales since the 1920s (IWC 1997). United States delegates and Makah representatives responded that the Makah Tribe had continued aspects of its whaling tradition through names, dance, songs, and other cultural traditions (IWC 1997; United States 1996). The United States also noted that nutritional need is a factor in considering and setting aboriginal subsistence whaling catch limits, but not a threshold requirement. United States delegates used the example of the IWC setting a catch limit for the bowhead stock for many years after considering the United States' requests on behalf of the Alaska Eskimos, even though the Nutrition Panel at the 1979 workshop for aboriginal subsistence whaling of bowhead concluded that nutritional needs of Eskimos could be met through local subsistence or western-type foods (IWC 1979b; United States 1996). Moreover, the Makah needs statement (Renker 1996) had demonstrated a continued subsistence reliance on traditional marine foods available to the Makah, and a nutritional need based on poverty and economic conditions on the Makah Reservation (Renker 1996; United States 1996). The United States noted that federal agents in the last five decades had actively prevented Makahs from consuming and utilizing whales that drifted onto Makah beaches, by burying or burning the drift whales and by threatening Makah members who tried to access the products with jail and other federal sanctions (United States 1996). As late as the 1970s, federal agents were still entering Makah households and searching freezers for the presence of marine mammal products (United States 1996). Attendees of the 1996 meeting were also aware of other conflict regarding the Makah's proposal to hunt; the United States House of Representatives Committee on Resources had unanimously passed a resolution expressing opposition to the Makah hunt (United States Congress 1996), and some members of the Makah Tribe testified against the United States proposal at the IWC meeting. The United States made a statement in appreciation of the support from some delegates, noted the reservations expressed by others, and after, consultation with the Makah Tribe, announced that it was withdrawing its request for an amendment to the Schedule for the gray whale catch limit. The United States asked the IWC to defer consideration until the next year, when the ENP gray whale catch limit was due to expire, and the needs of the Chukchi people were also determined (IWC 1997).

In preparation for the annual meeting of the IWC in 1997, the United States considered comments made at the 1996 meeting that the gray whale catch limit should be shared with the Russian Federation, making the combined requests 140 rather than 145 gray whales per year (63 FR 16701, April 6, 1998). The gray whale catch limit set in the Schedule for the Russian Federation (acting on behalf of the Chukotka Natives) was due to expire in 1997, so the Russian Federation would have to request a new Schedule amendment for a five-year catch limit from 1998 through 2002 (63 FR 16701, April 6, 1998). After extensive discussions with the Alaska Eskimo Whaling Commission and the Makah Tribe, as well as an internal policy review, the United States delegation consulted with the Russian Federation delegation on the appropriate formulation for a request (63 FR 16701, April 6, 1998). The Makah made efforts to augment their needs statement and request, including conducting research and training on the proposed method of hunting whales (such as conducting field tests of rifles with Dr. Ingling, a veterinarian with IWC experience). They also gathered more information about the nutritional value of subsistence foods in their diet.

At the Aboriginal Subsistence Whaling Subcommittee meeting on October 18, 1997, the United States raised several points in support of the proposal: 1) law (the Treaty of Neah Bay specifically reserves the right of the Makah to hunt whales), 2) culture (the Makah have a 1,500-year tradition of whaling that has been of central importance to their culture), 3) science and conservation (there would be no adverse conservation impacts to the stock), and 4) Makah progress on improving the needs statement and request since the last IWC meeting (United States 1997; IWC 1998). Related to this last point, Dr. Ingling presented results of field trials on the weapon, ammunition, and techniques to be used in the Makah hunt (Ingling 1997; IWC 1998). A representative of the Makah Tribal Council also spoke, emphasizing the central focus and importance of whaling to Makah culture (IWC 1998). Opponents again raised concerns about the interruption in the Makah whaling practice. Some delegates thought that the Makah did not demonstrate nutritional and/or cultural need, based on the 1981 *Ad Hoc* Technical Working Group definitions of aboriginal subsistence whaling and consumption, while others stated that discontinuity of whaling practice should not be held against the Makah because they were deprived of cultural and traditional rights (IWC 1998). Some delegates thought the Makah had established cultural need beyond a doubt (IWC 1998).

At the 1997 IWC plenary session, the United States and the Russian Federation presented joint requests for bowhead and ENP gray whale catch limits to accommodate the needs of two aboriginal groups hunting from a single stock (Alaska Eskimos and s hunting bowheads and the Makah Tribe and Chukotka Natives hunting ENP gray whales). This was the first year in which two contracting governments simultaneously requested revisions to the Schedule for catch limits from the same stock. For the bowhead stock, delegates considered the joint request and adopted the catch limit of280 bowhead whales for the 1998 through 2002 five-year period, with a maximum limit of 67 per year, by consensus on the afternoon of October 22, 1997 (IWC 1998). The bowhead catch limit was allocated between the Russian Federation and the United States by a bilateral agreement.

For the ENP gray whale stock, the joint request of 620 gray whales for the 1998 through 2002 five-year period, with a maximum limit of 140 gray whales per year, was debated in IWC plenary session on the afternoon of October 22, 1997 (63 FR 16701, April 6, 1998). Some delegates suggested making an amendment to the introductory portion of the proposal. The debate session then adjourned to allow for consultation among the delegates (63 FR 16701, April 6, 1998). Specifically, two delegates proposed that the following words be added to paragraph 13(b)(2) of the Schedule, "whose traditional subsistence and cultural needs have been recognized by the

International Whaling Commission" (IWC 1998). United States delegates responded that the words "by the International Whaling Commission" were not acceptable, because the IWC had no established mechanism for recognizing such needs, other than adoption of a catch limit in the Schedule (63 FR 16701, April 6, 1998). The United States delegates expressed their understanding that adoption of a catch limit in the Schedule constituted IWC approval, with no further action required. A clear majority of Commissioners then expressed their support for the United States approach (63 FR 16701, April 6, 1998). When the plenary session resumed, the Chair announced consensus. The joint request of the United States and the Russian Federation for a gray whale catch limit was adopted on October 23, 1997, with the addition of the words "whose traditional aboriginal subsistence and cultural needs have been recognized" to the Schedule language (63 FR 16701, April 6, 1998; IWC 1998). The ENP gray whale catch limit was allocated between the Russian Federation and the United States by a bilateral agreement (120 gray whales per year for the Chukotka Natives, and an average of four gray whales per year, with a maximum of five, for the Makah).

At the annual meeting of the IWC in 2002, the IWC adopted a catch limit of 620 ENP gray whales for the 2003 through 2007 five-year period by consensus. The catch was limited to 140 takes per year, based on a second joint request of the United States and the Russian Federation (IWC Schedule 2002), which was similar to the first successful joint request in 1997. The United States and Russian Federation then allocated the ENP gray whale catch limit by bilateral agreement, to a maximum of 20 whales over the five-year period and up to five whales annually for the Makah, and a maximum of 600 gray whales over the five-year period and up to 135 per year for the Chukotka Natives.

At the annual meeting of the IWC in 2003, the Russian Federation noted anomalies in the Schedule about the way that Chukotka Natives are treated compared with other aboriginal groups operating under aboriginal subsistence whaling auspices (IWC 2004a; IWC 2004b). They proposed changes to the Schedule, including changes to paragraph 13(b)(2). Paragraph 13(b)(2) read as follows:

> [t]he taking of gray whales from the Eastern stock in the North Pacific is permitted, but only by aborigines or a Contracting Government on behalf of aborigines, and then only when the meat and products of such whales are to be used exclusively for local consumption by the aborigines whose traditional aboriginal subsistence and cultural needs have been recognized. . . .

The Russian Federation proposed to delete the words "whose traditional aboriginal subsistence and cultural needs have been recognized" (IWC 2004a; IWC 2004b). The Russian Federation's stated objective was to achieve consistency in the Schedule and to, therefore, eliminate discriminatory behavior against the native peoples of Chukotka, because they interpret such language restrictions as preventing the important practice of cultural exchange of goods among indigenous peoples (IWC 2004a; IWC 2004b). The IWC subsequently charged a small group, comprising the Russian Federation, Denmark, Australia, the United States, and the IWC Secretariat, to review paragraph 13 of the Schedule to determine how to achieve consistency across aboriginal subsistence whaling operations (IWC 2004a).

The small group submitted a report to the Aboriginal Subsistence Whaling Subcommittee at the annual meeting of the IWC in 2004 (IWC 2005a; IWC 2005b), together with proposed changes to the Schedule. The report had two key recommendations: 1) move the prohibition on take of calves and mother/calf pairs to the general principles governing all hunts in paragraph 13(a), 2) delete the language, "the aborigines whose traditional aboriginal subsistence and cultural needs have been recognized" from paragraph 13(b)(2) of the Schedule (IWC 2005a; IWC 2005b). The latter recommendation was related to the Russian Federation's interpretation that the quoted provision violated the human rights of Chukotka Natives, because the restriction was not included in other subparagraphs governing aboriginal subsistence whale hunts and, therefore, improperly discriminated against the Chukotka Natives (IWC 2005a; IWC 2005b). The Russian Federation maintained that the Chukotka Natives have equal rights to other aboriginal communities to use whale products (IWC 2005a; IWC 2005b).

At the 2004 IWC plenary session, delegates adopted the report of the small group and the proposed Schedule amendments by consensus, with one revision. They retained a calf and mother/calf take prohibition specific to St. Vincent and the Grenadines. Since 2004, the Schedule has read as follows for the ENP gray whale stock catch limit:

> [T]he taking of gray whales from the Eastern stock in the North Pacific is permitted, but only by aborigines or a Contracting Government on behalf of aborigines, and then only when the meat and products of such whales are to be used exclusively for local consumption by the aborigines (IWC Schedule 2005 and 2006 paragraph 13(b)(2)).

The IWC also adopted the 1979 Cultural Anthropology Panel's definition of subsistence use in 2004. See Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling, for more details about the text of the current Schedule, as well as for the text of the formally adopted definition on subsistence use.

On February 14, 2005, the Makah initiated the current proposal to hunt ENP gray whales and submitted a request for a waiver of the MMPA take moratorium to NMFS; NMFS had not published the 2003 through 2007 quota under the WCA due to the 2004 decision in *Anderson v. Evans*. In October 2005, the House of Representatives Committee on Resources passed a non-binding resolution (House of Representatives Congressional Resolution 267) by a vote of 21 to 6, expressing disapproval of the MMPA waiver process and stating that the United States should uphold the treaty rights of the Makah Tribe. The Committee's report (House Report 109-283) was placed on the House of Representatives' calendar without further action. NMFS is currently reviewing the Makah's proposal to hunt, as described in this chapter. At the May 2007 IWC meeting the United States and the Russian Federation again made a joint request for an ENP gray whale catch limit from the IWC for the 2008 through 2012 five-year period under similar terms as the last catch limit for 2003 through 2007. The catch limit was approved by consensus.

1.4.2 Summary of Recent Makah Whaling ─ 1998 through 2007

In 1998, NMFS published a yearly quota of up to five gray whales for the Makah in the Federal Register (63 FR 16701, April 6, 1998), operating under the 1998 to 2002 five-year quota. Although the Makah Tribal Council issued several whaling permits and tribal whalers conducted a number of practice exercises, they did not actually hunt whales that year. Protest activities and conflicts near and on the shores of Neah Bay during 1998 are described in Public Safety, Section 3.15.3.4, Behavior of People Associated with the Hunt. Protest vessels mobilized on November 11, 1998, but in response to a false report that the Tribe was hunting and had harvested a whale (United States Coast Guard [Coast Guard] 1998).

During the spring northward migration in 1999, NMFS again published a yearly quota of up to five gray whales for the Makah in the Federal Register (64 FR 28413, May 26, 1999). The Makah Tribal Council issued a 10-day whaling permit to the Makah whaling captain on May 10, 1999, based on the recommendation of the Makah Whaling Commission acting in accordance with the 1998 Gray Whale Management Plan. Whale hunting spanned four nonconsecutive days, May 10, 11, 15, and 17, and all hunts were conducted in the coastal portion of the Makah's U&A, south of Cape Flattery (i.e., outside the Strait of Juan de Fuca) to target whales migrating northward. Two vessels and crews were directly involved in the whale hunting activities, including the Makah whaling crew in their canoe, *The Hummingbird*, and a rifleman, backup harpooner, and diver on board the tribal chase boat. NMFS and Makah tribal fisheries observers were on board the NOAA observer boat *Research II*. In addition, media helicopters, one or two chartered media vessels, protest vessels, Coast Guard law enforcement, and shore-based supporters and opponents were present most of the time. A tribal commercial fishing boat, acting as a support vessel, was also nearby and available to assist the whalers.

On May 10, 1999, the first day of whale hunting, the Makah crew searched for gray whales near Father and Son Rock, Cape Alava, Spike Rock, Umatilla Reef, and Point of the Arches (Gosho 1999; United States Coast Guard 1999a). At least four whales were sighted throughout the day, with three of the four sightings occurring in 115 to 134 feet of water (Gosho 1999). The observers did not see calf-sized whales in the area (NMFS 1999). The Makah whaling crew threw one harpoon at a whale, but missed it (Gosho 1999; NMFS 1999; NMFS and Makah Tribal Council 2000). The hunt was disrupted by vessel-based protesters who maneuvered between the two Makah vessels and the whales. Protesters tried to scare off the whales, and they also fired flares and smoke flares at the Makah whaling party vessels (NMFS 1999; Sunde et al. 1999; United States Coast Guard 1999a). Because most of the hunting occurred south of the Coast Guard's regulated navigation area (RNA), a 500-yard moving exclusionary zone (MEZ) around the Makah vessels was not in effect (NMFS 1999). Coast Guard officials detained two of the protesters, who they subsequently cited for grossly negligent operation of a vessel, and the Clallam County sheriff then arrested the protesters for reckless endangerment (NMFS 1999; Sunde et al. 1999; United States Coast Guard 1999a). At least three media helicopters were present (United States Coast Guard 1999a). Hunting on May 11 (day two) continued in the same area, but the Makah whaling captain called it off in a few hours due to poor weather conditions (Gosho 1999; NMFS 1999). No whales were sighted or approached.

Whale hunting resumed on May 15, 1999, day three, near Father and Son Rock, Ozette Island, and the Bodeltehs (Gosho 1999), south of the RNA (NMFS 1999). Several gray whales were sighted in 87- to 95-foot-deep water, but the Makah crew was unable to maneuver *The Hummingbird* close enough to throw harpoons and was again interrupted by protest vessels (Gosho 1999). Around 11:00 a.m., the whalers sighted a whale and threw a harpoon, which was assumed to contact the whale because the wooden harpoon holder was split, and the float disappeared underwater for a short time (Gosho 1999; NMFS 1999). The strike did not appear to penetrate or embed in the animal because the harpoon head was intact and clean, the throw was parallel to the animal (rather than perpendicular), and the float resurfaced Gosho 1999; NMFS 1999). Because the harpoon did not embed in the whale and did not appear to cause serious injury, it did not meet the definition of a strike under the 1998 Gray Whale Management Plan. (Gosho 1999; NMFS 1999) Under that plan, a strike counted only if the harpoon embedded in the whale and if it might have resulted in death or serious injury. About an hour later, the

Makah harpooner threw another harpoon and missed (Gosho 1999). Protest vessels were active around the whalers much of the day. Two protest vessels came into contact with whales; one vessel ran over the top of a whale and temporarily stunned it, while another vessel hit the flukes of a diving whale beside the Makah canoe (NMFS 1999). The Coast Guard cited four vessels for grossly negligent operations and/or MMPA take infractions, and three of the vessels were taken into federal custody (NMFS 1999).

On May 17, 1999 (the fourth and final day of whale hunting), the Makah crew continued hunting southwest of Father and Son Rock, south of the RNA. No protest vessels attempted to disrupt the hunt, but three media helicopters covered events throughout the day (United States Coast Guard 1999b). At 6:55 a.m., the Makah crew sighted a whale and pursued it in the canoe; the whale surfaced on the right side of the canoe, and crew harpooned it as it moved across the bow of the canoe (Gosho 1999; NMFS 1999). The harpoon remained affixed to the whale, which pulled the harpoon line and floats underwater and towed the canoe (Gosho 1999; NMFS 1999). The whaling crew in the canoe held the harpoon line while the chase boat approached the whale for the Makah rifleman to kill the animal with a .577 caliber rifle. The gunner fired the first and second shots at 6:58 a.m.; both shots missed (Gosho 1999). At 7:01 a.m., a third shot was fired, striking the whale behind the blowhole and slightly to the left, momentarily stunning the whale (Gosho 1999). A second harpoon was also thrown at the whale, striking it on the right side towards the rear (Gosho 1999). The fourth and final shot was fired at 7:03 a.m., striking the whale behind the blowhole slightly to the right, and leaving the whale motionless at the surface (Gosho 1999). Immediately after the final shot, a third harpoon was thrown, striking the whale on the right side (Gosho 1999). The total time to death, from the initial harpoon strike to the last shot that dispatched the whale, was 8 minutes. The body of the whale sunk and was supported by the lines on the three attached harpoons (Gosho 1999). A Makah diver attached a heavier line around the tail stock of the whale for towing (Gosho 1999), and the whale was towed by a Makah support vessel to inside the breakwater at Neah Bay, where tribal members had gathered on the beach to celebrate the hunt. The whale was transferred from the support vessel to four canoes from various Washington Indian tribes, led by the crew of the Makah *Hummingbird* canoe, and towed from the deeper part of the breakwater into the shallow water at the edge of the beach (J. Sepez, pers. comm. 2007). The whale was then pulled onto the beach by approximately three dozen male tribal members, tugging in unison on hand-held ropes (J. Sepez, pers. comm. 2007).

The whale was butchered following tribal ceremonies. Tribal members removed almost all edible portions of the meat and blubber from the whale by midnight. NMFS biologists collected samples from internal organs after tribal members removed the meat and took it home or to the community freezer (Gosho 1999; NMFS 1999). Tribal members flensed small portions of meat the next day to prepare the skeleton for a museum display (NMFS 1999; NMFS and Makah Tribal Council 2000). Tribal members consumed the meat and blubber during tribal ceremonies (Gosho 1999; NMFS and Makah Tribal Council 2000; NMFS 1999). According to measurements NMFS and tribal observers took, the harvested whale was a non-lactating female that measured 30 feet, 5 inches (9.27 meters) long. Fluke width was 7 feet, 4 inches (2.2 m). The whale could not be weighed, but, based on gray whales taken by the Russian harvest of similar length and body condition, it was estimated to weigh approximately 5 to 7 metric tons. Age could not be determined either, but, based on similar lengths of whales taken in the Russian harvest, it was probably more than two years old. An examination of the skull during butchering revealed that the third shot struck the ridge of the skull, shattering it, and proceeded back into the muscle near the left flipper, where whalers found the bullet (the bullet was intact with no deformation). The fourth shot struck the skull above the occipital condyle and entered the braincase; it likely caused instantaneous loss of consciousness and death (Gosho 1999).

During the fall/winter southward migration in 1999/2000, the Makah Tribal Council did not issue any whaling permits because weather conditions were unsuitable. Hunting began during the spring northward migration for seven days between April 17, 2000, and May 29, 2000 (Gearin and Gosho 2000). The Makah tribal whalers actively hunted gray whales in the coastal portion of the Makah U&A south of Cape Flattery for seven days, during which no whales were harvested, struck, or struck and lost (Gearin and Gosho 2000). Except for a few approaches near Makah Bay, most hunting occurred south of Point of Arches near Father and Son Rock. Makah whalers threw harpoons on three occasions, but the harpoons did not attach to a gray whale on any of these attempts. The first two throws appeared to be complete misses (Gearin and Gosho 2000). The third throw may have grazed the whale; however, the harpoon did not implant or detach (Gearin and Gosho 2000). Most of the whales in the area during the hunt were large single individuals. The whales appeared to be actively migrating, because the average time between surface sightings (i.e., the average dive time) was about eight minutes, which is four or five minutes longer than the average dive time for whales feeding or resting locally, and the whales were farther offshore (i.e., 80 to 100 feet rather than 30 to 60 feet deep) (Gearin and Gosho 2000).

All hunts occurred within the Coast Guard's RNA and MEZ (Gearin and Gosho 2000). During the first two days of hunting (April 17 and 20), protesters disrupted the hunts (Gearin and Gosho 2000). On April 20, Coast Guard personnel boarded two protest vessels and issued warnings (United States Coast Guard 2000). One of the vessels entered the 500-yard MEZ on three occasions subsequent to the Coast Guard advisory; the Coast Guard again intercepted and warned it (United States Coast Guard 2000). On at least one of these three entrances into the MEZ, the vessel entered the 500-yard MEZ at high speed and was intercepted within 50 yards of the Makah's canoe (Gearin and Gosho 2000). Two individuals on jet skis also entered the MEZ, making high speed charges at the Makah canoe (United States Coast Guard 2000). The Coast Guard intercepted both jet skiers. One jet skier ran into a Coast Guard vessel and sustained shoulder injuries; Coast Guard personnel retrieved the individual from the water, placed her under arrest, and transported her to Olympic Memorial Hospital (United States Coast Guard 2000). The Coast Guard also intercepted and arrested the second jet skier, and transferred him to the Clallam County sheriff's office (United States Coast Guard 2000). After a temporary delay, hunting resumed for five nonconsecutive days in May (May 6, 7, 10, 12, and 29). One to three protester vessels were present during these times, but they did not enter the MEZ to disrupt whale hunting (Gearin and Gosho 2000). Media helicopters were present during most of the whale hunting and appeared to comply with the Sanctuary's 2,000-foot minimum allowable flight altitude.

Makah whalers had intended to continue whaling into June, but the Makah Tribal Council did not issue any permits after the June 9, 2000 ruling by the Court of Appeals for the Ninth Circuit in *Metcalf v. Daley* (2000). The Makah Tribal Council did not issue any whaling permits during the gray whale southward migration in fall/winter 2000. The whale harvested in 1999 is the only whale that the Makah have harvested in contemporary times. Some Makah members have, however, participated in whale hunt research, education, and training with other indigenous groups. In August of 2005, for instance, two Makah members and a tribal whale biologist traveled to the eastern shores of the Russian Federation. The biologist was involved in an IWC scientific exchange to evaluate the type of data that Chukotka Natives collected in their hunts and to evaluate the logistics of studying the 'stinky whale phenomenon' (whales that have a strong chemical smell and are inedible). The Makah members participated in a cultural exchange to observe the Chukotka gray whale hunts and to receive training in whale hunting techniques and whale butchering.

On September 8, 2007, five members of the Makah Indian Tribe hunted and killed a gray whale in the Strait of Juan de Fuca in a hunt that was not authorized by the Tribe or NMFS. This unauthorized hunt did not comply with numerous provisions and restrictions defined in the Tribe's application, and both the Tribe and NMFS made statements condemning the unlawful hunt (Hogarth 2007; Rosenberg 2007).

The five tribal members used two boats and had in their possession a .577 caliber rifle and a Weatherby .460 caliber rifle (*U.S.A. v. Gonzales et al*. 2007). One of the boats and all of the rifles belonged to the Tribe and were obtained by one of the members of the hunting party (*U.S.A. v. Gonzales et al.* 2007). Sometime on the morning of September 8, the hunters approached a gray whale approximately 40 feet long near Seal Rock and harpooned it with at least five harpoons (Mapes 2007). They then shot the whale at least 16 times (*U.S.A. v. Gonzales et al.* 2007). According to a report by the Tribe, none of the members of the hunting party had received tribally sanctioned training in use of the weapons to kill gray whales (Scordino 2007a). A tribal biologist who evaluated the whale's condition in the afternoon of September 8 counted four visible harpoons and 16 bullet holes (Scordino 2007b). The whale died shortly after 7:00 p.m. on September 8 (Scordino 2007b).

On October 5, 2007 the five tribal members were indicted in federal court for unauthorized whaling, unauthorized take of a marine mammal, and conspiracy to engage in unlawful whaling (*U.S.A. v. Gonzales et al.* 2007). On November 16, 2007, the five were charged in tribal court for violating the Tribe's gray whale management plan, violating state and federal laws, and reckless endangerment (Casey 2007; *Makah Tribe v. Andrew Noel* 2007). On March 27, 2008, three of the tribal members entered guilty pleas to unlawful taking a marine mammal in violation of the MMPA (*U.S.A. v. Gonzales* 2008; *U.S.A. v. Parker* 2008; *U.S.A. v. Secor* 2008). Their sentencing is currently scheduled for June 30, 2008. On April 7, 2008, after a Bench Trial on Stipulated Facts, the court found the remaining two tribal members guilty of conspiracy and unlawful taking of a marine mammal in violation of the MMPA (*U.S.A. v. Noel and Johnson* 2008). Their sentencing is also scheduled for June 30, 2008. The criminal charges filed in the Makah Tribal Court are pending.

1.4.3 Other Environmental Assessments and Court Decisions Informing this Action

In 1996, NMFS entered into a cooperative agreement with the Makah Tribe to ensure a United States request before the IWC to amend the Schedule's catch limit for the ENP gray whale stock and jointly manage the gray whale hunts. Before NMFS could publish any quota for the Makah Tribe, it had to amend the WCA regulations, which only provided for aboriginal subsistence whaling by the Alaska Eskimo Whaling Commission. NMFS conducted a NEPA analysis on its proposed rule to amend the regulations and on March 26, 1996, issued a finding that the proposed regulations would not have a significant impact on the environment.

In 1996, the United States' request on behalf of the Makah Tribe to the IWC to revise the Schedule's catch limit for ENP gray whales met with resistance, and the United States withdrew the request. In response to concerns raised by some conservation organizations, in June 1997, NMFS initiated a NEPA process to analyze the environmental impacts of a decision to publish an aboriginal subsistence whaling quota under the WCA for the Makah's use of up to five ENP gray whales annually. The draft EA was released for comment in August 1997. A few months later, NMFS entered into a second cooperative management agreement with the Makah Tribe. It was similar to the first, except that the second agreement included time and area restrictions aimed at reducing the likelihood of taking a gray whale from the local area (Pacific Coast Feeding Aggregation survey area). NMFS and the Makah entered into the agreement on October 13, 1997, and NMFS issued the final EA and a FONSI four days later.

Conservation groups challenged NMFS' FONSI in court, and the Ninth Circuit set aside the EA and FONSI in *Metcalf v. Daley* (2000), because NMFS did not produce them until after entering into the cooperative agreement with the Tribe. With the court's invalidation of the EA and FONSI, NMFS terminated the second cooperative agreement with the Makah Tribe and began a second NEPA process. On July 12, 2001, NMFS issued a second EA and FONSI regarding a similar Makah whaling proposal. Conservation groups challenged that EA and FONSI in court, and the Ninth Circuit ruled that the agency should have prepared an EIS rather than an EA in *Anderson v. Evans* (2004).

On March 6, 2003, NMFS initiated an EIS to assess the environmental impacts of publishing the 2003 to 2007 quota for the Makah's use under the WCA (68 FR 10703). Due to pending litigation, NMFS did not complete the EIS. In initiating the present process to prepare an EIS, NMFS gave notice it was terminating the previous EIS initiated in 2003 (70 FR 4991, August 25, 2005). The present EIS assesses the environmental impacts of publishing the 2008 to 2012 quota for the Makah's use under the WCA.

1.5 Scoping and the Relevant Issues

1.5.1 Scoping Process

Scoping is an open process agencies must conduct under NEPA to determine the range and significance of the issues to be analyzed in depth in an EIS (40 CFR 1501.7). As part of the scoping process, agencies invite the participation of affected federal, state, and local agencies, Indian tribes, the proponent of the action, and other interested persons, all of whom help to identify relevant issues to address in the EIS, while helping the agency eliminate insignificant issues from detailed study. Scoping can also help determine the level of analysis and types of data needed. The scoping process for this EIS involved a number of activities that included both internal and public scoping. These activities are described in the following paragraphs.

1.5.1.1 Internal Scoping

NMFS received the Makah Tribe's request for a limited waiver of the MMPA take moratorium on February 14, 2005, and initiated internal scoping shortly thereafter, in the spring of 2005. During internal scoping, NMFS identified a preliminary list of resources to address in the EIS, along with five preliminary alternatives (including the No-action alternative) to serve as starting points for discussion. NMFS conducted this effort to help the public provide meaningful comments on resource issues and alternatives to the proposed action during the public scoping period. NMFS reevaluated the preliminary resources and alternatives following receipt and review of public comment.

1.5.1.2 Public Scoping

1.5.1.2.1 Public Comment Periods and Meetings

NMFS initiated public scoping on August 25, 2005, by publishing a Notice of Intent (NOI) to conduct public scoping meetings and prepare an EIS in the FR (70 FR 49911). The NOI announced a 60-day comment period (August 25 to October 24, 2005) to gather public input on the scope of the EIS, resources to analyze, and alternatives to consider. The NOI also included the dates, times, and locations of three public scoping meetings in Washington State, provided background information related to the proposed action, and included the list of resources and preliminary alternatives identified during internal scoping. NMFS noted that the scope of the NEPA review was limited specifically to the MMPA formal rulemaking process (i.e., waiving the take moratorium and issuing regulations and any necessary permits). NMFS published a second NOI with the same background information on October 4, 2005 (70 FR 57860), to set a fourth scoping meeting in Silver Spring, Maryland, in response to public requests for an additional public meeting in the Washington D. C. area.

In addition to the two NOIs, NMFS notified the public that scoping began by issuing a press release to local media on August 25, 2005, and placing three public notices in key northwest Washington newspapers, including the *Peninsula Daily News* (September 19, 2005), *Seattle Post-Intelligencer* (September 21, 2005), and *Seattle Times* (September 21, 2005). The agency also mailed an informational letter to interested parties (from a mailing list of 824 federal, state, county and local agencies, elected officials, Native American organizations, nongovernmental organizations, businesses, media outlets, libraries, and individuals) to provide information about the dates, times, and locations of the public scoping meetings, as well as details about the meeting format. The two NOIs, the NOAA Fisheries press release, and the informational letter were posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov) before the meetings and were provided at the public meetings. NMFS also wrote additional information and provided other background material to the public through its website and at the public meetings. These information sheets consisted of the following: '*Gray Whale Fact Sheet*,' '*Chronology of Major Events Related to the Makah Tribal Whale Hunt*,' and '*Overview of the Makah Indian Tribe's Waiver Request*.' Preaddressed comment forms and compact discs containing the Makah's waiver request were available at the meetings, and the public had an opportunity to share materials with one another. All scoping meetings were in October 2005 (Table 1-2).

TABLE 1-2. SCHEDULE AND LOCATION OF PUBLIC SCOPING MEETINGS

DATE	TIME	PLACE	CITY
October 5, 2005	6:30 to 9:30 p.m.	Makah Tribal Council Community Hall	Neah Bay, WA
October 6, 2005	6:30 to 9:30 p.m.	Vern Burton Memorial Community Center	Port Angeles, WA
October 11, 2005	6:30 to 10:00 p.m.	South Lake Union Park	Seattle, WA
October 18, 2005	10:00 a.m. to 1:00 p.m.	NOAA Auditorium	Silver Spring, MD

The public scoping meetings followed a workshop format to provide an opportunity for interaction between NMFS staff and the public in small group discussions. Each meeting began with an introduction by a facilitator, followed by two PowerPoint presentations given by NMFS employees (one presentation on the NEPA review process related to the Makah's request for a waiver of the MMPA take moratorium and one presentation on gray whale biology and population status). NMFS staff and contractors then facilitated small group discussions where the meeting attendees were invited to comment on the proposed action, focusing on resources to analyze and alternatives to consider in the EIS. Although comments from the small group discussions were captured in writing, they were not recorded verbatim. Facilitators reconvened all meeting attendees at the end of each session to present some of the major themes from the small group discussions. Attendees were encouraged to provide more detailed statements through written comments by using mail, email, fax, or comment forms.

NMFS reviewed both verbal and written comments received during public scoping and drafted a scoping report to document the scoping process and summarize public comments. Several comments related to the IWC and WCA aboriginal subsistence whaling processes (e.g., precedential effects and subsistence). In response to these comments, the agency reconsidered the previous decision to conduct NEPA review only on the MMPA formal rulemaking process. NMFS ultimately decided that because it was considering the authorization of the Makah proposed whale hunting under both the WCA and the MMPA, a single EIS should be conducted to review these related actions. A third NOI was published in the Federal Register on February 27, 2006 (71 FR 9781), notifying the public of NMFS' decision to expand the scope of the EIS to include WCA publication of a quota and reopening another 30-day comment period (February 27 through March 29, 2006). Another letter to interested parties notified them of the second comment period (NMFS updated the mailing list to 1,066 entries following the public meetings). Both the NOI and the letter were posted on the NMFS Northwest Region's website (http://www.nwr.noaa.gov/Marine-Mammals/Whales-Dolphins-Porpoise/Gray-Whales/Makah-Whale-Hunt.cfm).

1.5.1.2.2 Other Public Scoping

On September 15, 2005, 24 letters went to Indian tribes and organizations in the Northwest informing them of NMFS' intent to prepare an EIS and inviting them to participate in the process. No requests were received for formal participation.

Five letters were also sent to federal agencies on September 14, 2005, inviting them to participate in the NEPA process as cooperating agencies, including NOAA's National Marine Sanctuaries Program, Olympic Coast National Marine Sanctuary staff, the United States Fish and Wildlife Service (FWS), the Coast Guard, the Environmental Protection Agency (EPA), and the Bureau of Indian Affairs. Of those invited, the Bureau of Indian Affairs accepted NMFS' invitation to be a formal cooperating agency in a letter dated October 27, 2005. The Bureau of Indian Affairs has participated in the preparation of this EIS.

1.5.2 Concerns Identified During Scoping

The following concerns were identified during both internal and public scoping. Detailed discussions of many of these concerns occur throughout this document.

1.5.2.1 Water Quality

- Potential effects to marine ecosystem from worst-case scenario vessel fuel/contaminant spill or protesting equipment
- Potential effects to quality of local drinking water from exposure to whale products
- Potential effects to marine ecosystem from exposure to whale products

1.5.2.2 Marine Habitat and Species

- Potential effects on marine habitat (such as kelp beds, surfgrass, intertidal area, or other habitat features)
- Potential effects of removing whales from the ecosystem

1.5.2.3 ENP Gray Whales

- Potential effects on the ENP gray whale population of removing individual whales in the project area by hunting
- Potential effects on gray whale presence in the local area (Pacific Coast Feeding Aggregation survey area) as a result of removing individual whales from the project area or from disturbing or frightening the whales in connection with hunting activities
- Potential effect on individual gray whales from specific hunting methods

1.5.2.4 Other Wildlife Species

- Potential effects on wildlife of noise
- Potential effects on wildlife of visual disturbance
- Potential effects on wildlife from fuel/contaminant spills
- Potential direct effects on wildlife from unintentionally striking animals with vessels or weapons
- Potential indirect effects on marine wildlife resulting from changes in prey availability due to the removal or redistribution of gray whales

1.5.2.5 Economics

- Potential economic effects on land-based, tourism-related businesses
- Short-term effects of tourism increase or decrease related to whale hunts
- Long-term effects of whale hunting on county-wide tourism
- Potential economic effects on water-dependent businesses
- Effects on the local (Strait of Juan de Fuca), Pacific Northwest, and Pacific coast whale-watching industry
- Effects on the international shipping and local commercial and recreational fisheries

1.5.2.6 Environmental Justice

- Potential disproportionate socioeconomic (employment and income) effects on minority and low-income populations
- Potential disproportionate sociological effects on minority and low-income populations

1.5.2.7 Social Environment

- Potential effects on attitudes and emotions, including spiritual beliefs

- Potential effects on human relations

1.5.2.8 Cultural Resources

- Potential impacts to archaeological and historical sites or traditional cultural properties in the project area

1.5.2.9 Ceremonial and Subsistence Resources

- Potential impacts to Makah culture from resuming whaling
- Potential impacts to Makah culture from not being allowed to resume whaling

1.5.2.10 Noise

- Disturbance to human visitors in the immediate vicinity of hunting activities
- Disturbance to onshore communities or homes on the Makah Reservation

1.5.2.11 Aesthetics

- Visual effects on on-scene observers of the hunt
- Visual effects on off-site observers of the hunt through the media

1.5.2.12 Transportation

- Potential for the hunt and related activities to interfere with normal marine vessel traffic
- Potential for the hunt and related activities to interfere with normal aircraft traffic
- Potential for the hunt and related activities to interfere with normal highway traffic
- Potential for hunt and related traffic to cause accidents or disrupt essential emergency services transit

1.5.2.13 Public Services

- Potential for hunt-related activities to result in injuries or other emergency incidents that exceed the capacities of tribal and other local public health facilities
- Potential for hunt-related activities to affect and potentially overwhelm tribal, county, and Coast Guard law enforcement personnel and facilities
- Potential for hunt-related activities to detract from enforcement needed in other areas

1.5.2.14 Public Safety

- Potential effects on public and hunter safety related to possible methods of dispatching whales
- Potential effects on public and hunter safety from wounded whales
- Potential effects on public and hunter safety of prevailing weather and sea conditions
- Potential effects on public and hunter safety related to protest activities and conflicts

1.5.2.15 Human Health

- Potential positive health effects on tribal members and others consuming any whale products
- Potential negative effects from ingesting potential contaminants contained in freshly harvested and drift whale products

1.5.2.16 Concerns not Specifically Related to a Resource Area

- Precedential effect on the MMPA if take moratorium is waived (would other tribes or organizations be able to obtain waivers more easily)
- Precedential effect on whaling world-wide if a hunt is authorized
- Effect on the Makah and other tribes associated with upholding or denying treaty rights
- International effect of denying an ethnic minority a subsistence right secured in a treaty

1.6 Relationship to Other Treaties, Laws, Regulations, Policies, and Processes

Various authorities — both international and national (federal, state, and local) treaties, laws, regulations, policies, and processes — may apply to the whale hunting activities proposed by the Makah Tribe. While some of these authorities require specific agency action before any hunt, such as promulgation of regulations and issuance of permits, others require agency review and consultation. Table 1-3 lists those authorities that are most relevant to the Makah Tribe's proposed whale hunting.

TABLE 1-3. INTERNATIONAL, NATIONAL, STATE, AND TRIBAL TREATIES, LAWS, REGULATIONS, POLICIES, AND PROCESSES THAT MAY BE REQUIRED FOR MAKAH WHALING

AUTHORITY	OVERSIGHT BODY	DESCRIPTION OF AUTHORITY, NECESSARY ACTION, OR REVIEW/CONSULTATION
IWC Schedule, Paragraph 13 (Aboriginal Subsistence Whaling Catch Limits)	IWC and United States government	Sets catch limits by whale stock based on requests from contracting governments acting on behalf of aborigines (and informed by scientific advice). United States has submitted requests, and the IWC has set catch limits, on behalf of the Makah.
Treaty of Neah Bay	United States government and NMFS	Establishes fishing, whaling, and sealing rights for the Makah. United States and NMFS must decide how best to meet their federal trust responsibilities.
MMPA	NMFS	Prohibits the take of marine mammals, subject to a waiver of the moratorium and/or compliance with a statutory exemption. Consistent with the 9th Circuit decision in *Anderson v. Evans* (2004) and in response to the Makah tribe's request to whale, NMFS must initially decide whether to waive the moratorium on take for the Makah's proposed whale hunting, proceed through formal rulemaking, including a possible on-the record hearing, and issue regulations and permits.
WCA	NOAA Office of International Affairs and NMFS	Implements United States obligations under the ICRW. NMFS must decide whether to enter into a cooperative agreement with the Makah Tribe for co-management of the gray whale hunts and whether to publish an aboriginal subsistence whaling quota for the Makah's use.
NEPA	Council on Environmental Quality / EPA and NMFS	Requires that an EIS be prepared for every major federal action with the potential to significantly affect the quality of the environment. Consistent with the 9th Circuit decision in Anderson v. Evans NMFS is preparing this EIS and will eventually issue an ROD.
ESA	FWS/NMFS	Requires federal agencies to consult with the FWS or NMFS (depending on species jurisdiction) to ensure that activities authorized, funded, or carried out by federal agencies are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. NMFS may consult internally and FWS for the 16 ESA-listed species and designated killer whale critical habitat in the project area.
Magnuson-Stevens Act	NMFS	Requires federal agencies to consult with NMFS with respect to any action authorized, funded, or undertaken (or proposed to be the same) when the action may adversely affect any essential fish habitat.

TABLE 1-3. INTERNATIONAL, NATIONAL, STATE, AND TRIBAL TREATIES, LAWS, REGULATIONS, POLICIES, AND PROCESSES THAT MAY BE REQUIRED FOR MAKAH WHALING

AUTHORITY	VERSIGHT BODY	ESCRIPTION OF AUTHORITY, NECESSARY ACTION, OR REVIEW/CONSULTATION
National Marine Sanctuary Act	NOAA National Ocean Service, National Marine Sanctuaries Program	Requires federal agencies to consult with NOAA when a proposed action internal or external to any sanctuary is likely to destroy, cause the loss of, or injure a sanctuary resource. NMFS may consult with Sanctuary staff.
Coastal Zone Management Act O	Washington Department of Ecology (Ecology)	Requires federal agencies to ensure that activities carried out in or outside the state's coastal zone are consistent with the enforceable policies of approved state management plans, to the maximum extent practicable. NMFS may consult with Ecology.
Migratory Bird Treaty Act and Executive Order 13186 (Migratory Birds)	FWS D	Prohibits intentional and unintentional take of migratory birds. NMFS may consult with FWS.
Executive Order 12898 (Environmental Justice)	EPA	Provides for fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
National Historic Preservation Act	Washington State Historic Preservation Officer (SHPO) and Tribal Historic Preservation Officer (THPO)	Requires federal agencies to consider cultural resources as part of all licensing, permitting, and funding decisions when the proposed action may have an effect on properties included in or eligible for the National Register of Historic Places. NMFS has assessed the potential impacts on registered historic sites in the project area and concludes that consultation is not necessary.
Clean Water Act	EPA; Washington Department of Ecology, and Makah Tribal Council	Establishes standards and regulations by which waters of the state must be managed. NMFS will provide this draft EIS to Ecology for its review.
Makah Whaling Permit	Makah Tribal Council and Makah Whaling Commission	Reviews whaling crew qualifications, identifies whaling crew and vessel participation, and provides other hunt restrictions. The Makah Tribal Council would issue the permit to a whaling captain before any hunt, based on recommendations from the Makah Whaling Commission.

1.7 Organization of this EIS

This EIS is organized in the following categories and chapters:

- Executive Summary
- Table of Contents
- List of Acronyms and Abbreviations
- Glossary
- Chapter 1, Purpose and Need
- Chapter 2, Alternatives
- Chapter 3, Affected Environment
- Chapter 4, Environmental Consequences
- Chapter 5, Cumulative Effects
- References
- List of Preparers and Agencies Consulted
- Distribution List
- Appendix

Chapter 2 Alternatives

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2.0 ALTERNATIVES

2.1 Introduction

This chapter describes and compares the alternatives under consideration, including the proposed action. Figure 1-1 in Chapter 1 provides a map of the Makah Indian Tribe's (Makah's or Tribe's) usual and accustomed fishing grounds (U&A) and the proposed action area within the Makah U&A where the Tribe proposes to hunt eastern North Pacific (ENP) gray whales for ceremonial and subsistence purposes. All further references to 'gray whales' or 'whales' in this chapter are to ENP gray whales. Section 2.2 describes the process NMFS followed to formulate the alternatives. Section 2.3 describes the alternatives analyzed in detail in this environmental impact statement (EIS). Section 2.4 includes alternatives NMFS considered but eliminated from detailed analysis, and Section 2.5 compares the way the alternatives NMFS is analyzing in detail address the key concerns raised during scoping (described in Section 1.5.2, Concerns Identified During Scoping), which are summarized below:

- Conservation impacts (to gray whales and the local marine ecosystem)
- Impacts on the Makah Tribe
- Other impacts on the local human environment (such as public safety, aesthetics, public sentiment regarding whales, and tourism/whale-watching)

Table 2-2, which is placed at the end of this chapter, is a resource matrix that compares the resource effects among alternatives.

2.2 Alternative Development Process

The National Marine Fisheries Service (NMFS) received the Makah's request for a waiver of the Marine Mammal Protection Act (MMPA) take moratorium in February of 2005. NMFS reviewed the request and concluded that it contained relevant and appropriate information to warrant proceeding with a full evaluation. The agency held a series of internal meetings to determine appropriate public scoping procedures and to identify a set of preliminary alternatives to serve as a starting point for discussions in public scoping meetings. Section 1.5.1.1, Internal Scoping, contains detailed information on the process. NMFS initially focused the scope of its review on the MMPA formal rulemaking process (Section 1.2.3, Marine Mammal Protection Act, for more detail about the legal framework and formal rulemaking process of the MMPA). Four public scoping meetings were held in the fall of 2005 at which the public was invited to offer and discuss potential alternatives to be analyzed and discuss resources that may be affected by those alternative actions in the project area. Section 1.5.1.2, Public Scoping, contains more detail.

During fall of 2005, NMFS also received 247 written public comment submittals during the 60 days of public scoping. Several comments addressed the International Whaling Commission (IWC) and Whaling Convention Act (WCA) aboriginal subsistence whaling processes and associated catch limits and quotas, leading NMFS to reconsider its previous decision to analyze only the MMPA formal rulemaking process in this EIS. In January 2006, the Makah Tribe wrote a letter asking NMFS to consider its request to resume whaling under all applicable laws and regulations, including the WCA. In February 2006, NMFS published a notice of its decision to expand the scope of the EIS to include publication of aboriginal subsistence whaling quotas for the Makah under the WCA. This decision allowed NMFS to address all key concerns under its jurisdiction related to Makah whaling in a single EIS. NMFS reopened public comment for 30 days in the spring of 2006 and received 91 written public comments (Section 1.5.1.2, Public Scoping, for more information about the public scoping process). The agency then developed a full range of EIS alternatives for internal review and discussion, based on its review of several sources of information:

- The Makah Tribe's request
- Public comment
- Input from other Federal agencies, (including the Bureau of Indian Affairs as NMFS' cooperating agency)
- NMFS' previous experience conducting environmental reviews of Makah whaling proposals
- The MMPA and its regulations
- The WCA and its regulations
- The Council on Environmental Quality's National Environmental Policy Act (NEPA) regulations (40 Code of Federal Regulations [CFR] 1500-1508)
- Other applicable statutes and regulations
- The Treaty of Neah Bay
- The federal trust responsibility

The Council on Environmental Quality's regulations require that an agency consider and assess the environmental consequences of a No-action Alternative, the proposed action alternative, and other reasonable alternatives (40 CFR 1502.14). Reasonable alternatives, along with the proposed action and the No-action Alternative, must be rigorously explored and objectively evaluated in the EIS and presented in comparative form to define the issues sharply and provide the decision-maker with a clear basis for choice among the options (40 CFR 1502.14). An agency preparing an EIS must, therefore, make a threshold determination of reasonableness when selecting alternatives from those identified during internal and public scoping. Alternatives that meet the reasonableness threshold are analyzed in detail in the EIS, while alternatives that do not meet this threshold are eliminated from detailed study.

The Council on Environmental Quality's regulations and guidance include general quantitative and qualitative factors to consider when evaluating reasonableness of alternatives. According to the Council on Environmental Quality's '40 Most Asked Questions' publication, the number of reasonable alternatives to analyze in detail depends on the nature of the case, but should cover a full spectrum of alternatives to the proposed action (46 Federal Register [FR] 18026, 18027(1b), March 23, 1981). Qualitatively, reasonable alternatives include those alternatives that are practical or feasible from the technical and economic standpoint and use common sense, rather than being simply desirable from the standpoint of the applicant (46 FR 18027(2a)). Reasonable alternatives may also be outside the legal jurisdiction of the lead agency (that is, may require legislative implementation) (46 FR 18027(2b)).

To develop the full range of action alternatives, NMFS considered the principal components associated with a hunt. These components were identified during scoping:

1. The time when whale hunting would occur
2. The area where whale hunting would occur
3. The annual and five-year limits on the number of whales harvested, struck, and struck and lost
4. Cessation of whale hunting if a predetermined number of identified whales were harvested
5. The method of hunting

NMFS developed a full range of reasonable alternatives by combining and varying these components in ways that would illuminate potential impacts and key concerns. The agency did not develop separate alternatives that would alter the fifth component, the method of hunting. Instead NMFS identified all possible methods of striking and killing whales, based on the Tribe's request, internal scoping, public comments, and an examination of aboriginal subsistence hunting world-wide. It eliminated from consideration those hunting methods considered unreasonable. Those methods, and the basis for concluding they are unreasonable, are described in Section

2.4.5, Employ Different Hunting Methods. The hunting methods not eliminated as unreasonable are included for analysis and incorporated into each of the action alternatives. The method of hunting is, therefore, treated as an element common to all action alternatives. All components are described more fully below under the proposed action and other action alternatives.

To assess the reasonableness of an alternative, NMFS considered the potential of the alternative to meet the project's purpose and need. Factors considered included consistency with applicable law, practicability and feasibility, and the extent to which it would identify and illuminate potential impacts or key concerns (see the summary of key concerns above in Section 2.1, Introduction).

2.3 Alternatives Considered for Detailed Study

This EIS analyzes six alternatives in detail. Outside of the No-action Alternative (described in Section 2.3.1), the five action alternatives (described in Sections 2.3.3 through 2.3.7) would allow the Makah Tribe to conduct limited ceremonial and subsistence hunting of gray whales, but would impose different restrictions on any hunt. These restrictions would differ with respect to the first four principal components discussed above in Section 2.2, Alternative Development Process. Differences in those components among all alternatives are displayed in Table 2-1. All action alternatives would require NMFS to waive the take moratorium, promulgate regulations, issue a permit under the MMPA, and authorize whaling under the WCA by publishing a quota. Other elements in common among action alternatives, including method of the hunt, are described below in Section 2.3.2, Elements Common among Action Alternatives. Alternatives NMFS considered but eliminated from detailed study are described in Section 2.4, Alternatives Considered but Eliminated from Detailed Analysis. Alternatives NMFS determined were out of scope are described in a separate memorandum to the file (NMFS 2007a).

2.3.1 Alternative 1 (No-action)

The No-action Alternative would result in no authorized hunting of gray whales by the Makah Tribe. NMFS would not waive the MMPA take moratorium, promulgate regulations, issue permits, publish any quota for the Makah under the WCA, or enter into any cooperative management agreement with the Makah Tribe for ENP gray whale hunts. The IWC catch limit of 620 whales for the five-year period beginning in 2008 would not change if NMFS were to adopt the No-action Alternative. Under the No-action Alternative, no part of the catch limit would be allocated to the Makah Tribe, so the entire catch limit would be available for harvest by the

Chukotka Natives. Examining the No-action Alternative will provide the public and NMFS with information about the following:

- Cultural and social impacts on the Makah Tribe if tribal members are unable to exercise their treaty right to hunt whales in their U&A
- Conservation impacts on gray whales and the local marine ecosystem if no gray whales are hunted in the action area
- Social effects from no hunting, including public safety, aesthetics, and public sentiment regarding whales
- Tourism/whale-watching effects if no gray whales are hunted in the action area

2.3.2 Elements Common among Action Alternatives (Alternatives 2 - 6)

All of the action alternatives would allow the Makah Tribe to conduct limited ceremonial and subsistence hunting of gray whales. Consistent with the bilateral agreement between the United States and Russia, gray whales harvested by the Makah Tribe would be counted against the IWC catch limit and not available for harvest by the Chukotka Natives. The action alternatives have several elements in common, which are discussed in detail under Alternative 2 (Proposed Action, Section 2.3.3) and which also apply to the remaining alternatives. The descriptions for Alternatives 3 to 6, therefore, describe only those elements that are distinct from Alternative 2. Elements in common among all action alternatives include the following:

- MMPA waiver, regulations, and any necessary permits
- WCA quota publication and execution of a cooperative agreement
- Hunting of gray whales only (no other marine mammal would be harvested)
- No hunting of a whale calf or whale accompanied by a calf
- Gray whale product use and distribution
- Certain public safety measures and enforcement
- Training, certification, and permit process for tribal whalers and whaling captain
- Makah Department of Fisheries Management and NMFS hunt observers
- Tribal enforcement of whaling regulations
- Adaptive management plan with monitoring
- Ongoing gray whale management and monitoring at the national and international levels
- Method of hunt

During public scoping, several commenters asked that this EIS examine alternative methods of hunting (the last item in this list). The method of hunting itself includes the vessels used to scout, pursue, and tow animals, as well as the weapons used to strike and/or kill animals. Different methods may have different effects on individual whales, on other marine wildlife (for example disturbance from noise associated with firearms), and on public and hunter safety. NMFS concluded this EIS could best identify and illuminate the impacts associated with alternative hunting methods by identifying reasonable options for striking and killing whales and by collectively treating those options as an element common among action alternatives, because each different method of hunting could be accommodated by all of the action alternatives. In the analysis of all action alternatives, therefore, this EIS will examine the impacts of the two options for striking and killing whales – the proposed method and an alternative method.

TABLE 2-1. PRIMARY DIFFERENCES AMONG ALTERNATIVES

WHALE HUNTING COMPONENTS		ALTERNATIVES					
		1 NO-ACTION	2 PROPOSED ACTION	3 HUNT OUTSIDE STRAIT, NO TIMING RESTRICTIONS, NO IDENTIFIED WHALE LIMITS	4 SANCTUARY AND NATIONAL WILDLIFE REFUGE RESOURCE ALTERNATIVE	5 HUNT OUTSIDE STRAIT, NO TIMING RESTRICTIONS, MORE RESTRICTIVE NUMBERS, NO IDENTIFIED WHALE LIMITS	6 HUNT ANYWHERE IN U&A, NO TIMING RESTRICTIONS, NO IDENTIFIED WHALE LIMITS
Hunt timing		Not authorized	December 1 through May 31	January 1 through December 31	Same as Alternative 2	Same as Alternative 3	Same as Alternatives 3, 5
Hunt area		None	U&A west of Bonilla-Tatoosh line1	Same as Alternative 2	Same as Alternative 2,3, except prohibit hunting within 200 yards of rocks and islands at all times	Same as Alternatives 2, 3	Entire U&A2
Maximum limit for harvested, struck, and struck and lost whales	Annual	0	Up to 5 harvested, 7 struck, and 3 struck and lost	Same as Alternative 2	Same as Alternatives 2, 3	Up to 2 harvested, 3 struck, and 1 struck and lost	Same as Alternative 2
	Five-year	0	Up to 20 harvested, 35 struck, and 15 struck and lost	Same as Alternative 2	Same as Alternatives 2, 3	Up to 10 harvested, 15 struck, and 5 struck and lost	Same as Alternatives 2, 3, 4
Additional limits for identified whales		Not Applicable	Yes	No	Same as Alternative 2	Same as Alternative 3	Same as Alternatives 3,5

1 U&A west of Bonilla-Tatoosh line is the Makah Tribe's U&A fishing grounds off the coast of Washington and west of the Bonilla-Tatoosh line, excluding the Strait of Juan de Fuca. See Figure 1-1.

2 The entire Makah Tribe U&A includes the Strait of Juan de Fuca and waters off the coast of Washington, as adjudicated by United States v. Washington (1974 and 1985). See Figure 1-1.

The Makah Tribe proposes to hunt gray whales using a hand-thrown, toggle-point harpoon to strike the whale and a .50 caliber rifle to kill the whale. As another option, this analysis also evaluates using explosive grenades to strike and/or kill whales. Both the Tribe's proposed method and this optional method are described in 2.3.3.2.5, Overview of Proposed Hunting Method. Other methods raised during the scoping process that are not analyzed in detail in this EIS are discussed in Section 2.4, Alternatives Considered but Eliminated from Detailed Analysis (Section 2.4.5, Employ Different Hunting Methods).

2.3.3 Alternative 2 (Proposed Action)

NMFS based its description of the Makah Tribe's proposed action on the Tribe's February 2005 MMPA waiver request and subsequent January 2006 request that NMFS take all actions necessary under applicable laws to allow treaty whale hunting. In its waiver request, the Tribe referred to a whale management plan it adopted in 1998 and revised in 2001 to govern its future proposed whale hunts. The Tribe's waiver request includes a proposal that NMFS issue regulations with provisions similar to those contained in the 2001 Gray Whale Management Plan. The waiver request and the management plan are provided as Appendix A to this EIS, along with the Makah's subsequent letter requesting that NMFS complete all legal processes necessary to authorize any hunts. In its MMPA waiver request, the Tribe proposed to abide by the specific conditions described below.

2.3.3.1 Regulatory Actions Requested of NMFS

The Makah Tribe is seeking to conduct limited hunting of gray whales in the coastal portion of the Makah U&A, (that is, excluding the Strait of Juan de Fuca) (Figure 1-1). Whaling is a right expressly secured in the 1855 Treaty of Neah Bay. Pursuant to the court's decision in *Anderson v. Evans* (2004), to hunt whales, the Makah Tribe is seeking to obtain domestic authorization from NMFS under two statutory authorities — the MMPA and the WCA.

Specifically, NMFS would have to authorize any Makah whaling by (1) waiving the moratorium prohibiting take of marine mammals under Section 101(a)(3)(A) of the MMPA, (2) promulgating regulations implementing the waiver and governing the hunts in accordance with Section 103 of the MMPA, (3) issuing any necessary permits to the Makah under Section 104 of the MMPA, and (4) entering into a cooperative agreement for co-management of the hunt and publishing any relevant aboriginal subsistence whaling quotas under the provisions of the WCA (see Section 1.2.3, Marine Mammal Protection Act, and Section 1.2.4, Whaling Convention Act, for a discussion of those statutes).

2.3.3.2 Eastern North Pacific Gray Whale Hunt Details

2.3.3.2.1 Species (Element Common among Action Alternatives)

The Makah Tribe is requesting a waiver to hunt gray whales only. No other species are included in their waiver request; thus, intentional take of marine mammals is not analyzed in this EIS (though the potential for incidental take is considered).

2.3.3.2.2 Numbers and Status of Whales Harvested (Five-year and Annual)

The Tribe proposes to limit the number of gray whales that may be harvested to no more than five whales in any calendar year and no more than 20 whales in any five-year period. A harvested whale is one that has been secured to the Makah canoe and/or chase boats and support vessels with floats and towing lines. Harvested whales might be landed on the beach for butchering, or lost at sea (i.e., struck and lost) and presumed dead. The Tribe's request refers to 'take' of whales, a term defined in the IWC Schedule to mean "to flag, buoy, or make fast to a whale catcher" (IWC Schedule 2006, paragraph (1)(c)), but defined in the MMPA to mean "harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill" (16 United States Code [USC] 1362(13)). To clarify the Makah's proposed hunting activities for the purposes of this EIS, NMFS substituted the phrase 'harvest' for 'take.' All whale hunting activities that the Makah propose (i.e., harvests, strikes, struck and lost, and harassed) are takes under the MMPA. The Tribe also proposes to limit the number of harvested whales further if necessary to meet international treaty obligations of the United States under the International Convention for the Regulation of Whaling (ICRW), or to prevent the abundance of the gray whale stock from falling below its optimum sustainable population (OSP) level (Section 3.4.2.1, Marine Mammal Protection Act Management, provides an explanation of OSP).

Additional Limits on Harvesting Whales Identified in Local Survey Areas

Generally, gray whales migrate seasonally along the coast of North America between a summer range as far north as the Chukchi and Beaufort Seas to a winter range as far south as the Baja California Peninsula and Gulf of California in northwestern Mexico. During the spring northward migration, most gray whales migrate as far north as the Bering, Chukchi, and Beaufort Seas to feed intensively during the summer months. Some whales find adequate food sources further south along their migration and remain to feed during the summer feeding period (approximately

June 1 through November 30). The whales that feed in the more southern portion of the summer feeding range are distributed along a continuum from California to southeast Alaska, including off the coast of Washington. NMFS' National Marine Mammal Lab (NMML) maintains a photographic catalog of gray whales observed in local survey areas during the summer feeding period, including the area from northern California to northern Vancouver Island, referred to here as the Pacific Coast Feeding Aggregation (PCFA) survey area, and a smaller survey area within the PCFA survey area from Oregon to southern Vancouver Island (ORSVI). Distinctive markings on the whales' backs and flukes allow individual identification. Using the photographic catalog, scientists can determine whether an identified whale has been sighted previously in either the PCFA or ORSVI survey areas during the summer feeding period. Section 3.4.3.1, General Life History and Biology (of ENP gray whales), describes the biology and ecology of gray whales in greater detail.

The Makah's proposed action contains two conservation measures related to these identified whales. They are (1) restricting the time and area of any hunt to reduce the likelihood that an identified whale would be harvested (discussed in Section 2.3.3.2.3, Location of Hunt, Area Restrictions, and Section 2.3.3.2.4, Timing of Hunt, Seasonal Restrictions) and (2) ceasing the hunt if a predetermined number of identified whales in the PCFA survey area are harvested.

The Makah Tribe's waiver request states that the Makah Department of Fisheries Management observers (Section 2.3.3.2.7, Other Environmental Protection Measures, Makah Department of Fisheries Management and NMFS Observers and Monitoring) would photograph any whale landed and provide the photographs to NMFS to compare with the NMML's photographic catalog. This would allow NMFS and the Tribe to determine if any harvested whale was an identified whale (a whale photographed in the PCFA and ORSVI survey areas in a prior summer feeding period). The Makah propose to use the photographic comparison to limit the number of identified whales that would be harvested. They would stop hunting when a predetermined number of matches are made to NMML's photographic catalog. That number would be established by calculating an allowable bycatch level using a method similar to one NMFS uses under the MMPA. The Makah's waiver request is discussed in detail in Appendix A, including information about the proposed 'allowable bycatch level' methodology. See Section 3.4.2.1, Marine Mammal Protection Act Management, Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, and Section 3.4.3.4.4, Population Dynamics and Trends, and Section 3.4.3.4.5, Potential Biological Removal, for more information about how NMFS manages marine mammals and the gray whale stock.

Strikes (Five-year and Annual)

The Makah Tribe would limit the number of gray whales that may be struck to no more than seven whales in any calendar year and no more than 35 whales in any five-year period. The Makah define ‘strike’ in their request as “any blow or blows delivered to a whale by a harpoon, rifle, or other weapon which may result in death to a whale, including harpoon blows if the harpoon is embedded in the whale, and rifle shots that hit a whale.” NMFS considers this definition equivalent to the WCA regulatory definition of a strike, meaning “hitting a whale with a harpoon, lance, or explosive device.” A whale is considered to be struck when a harpoon is or has been embedded in a whale. This definition of ‘strike’ includes situations where the harpoon disengages from a whale; is retrieved to the water surface clean of skin, blubber, and other whale parts; and there is no other evidence of potentially lethal injury (such as blood in the water). The Tribe also proposes to limit the number of whales struck to further meet ICRW obligations of the United States, or to prevent the ENP gray whale stock abundance from falling below its OSP level.

Struck and Lost (Five-year and Annual)

Whales that are known to be struck, but not ultimately secured to the vessel, are considered to be ‘struck and lost’ whales. The Tribe proposes to restrict the number of struck and lost whales to no more than three whales in any calendar year and no more than 15 whales in any five-year period. These numbers are included in the numbers for annual and five-year proposed strikes (i.e., three struck and lost whales per year is part of the seven whale strike limit per year, and not additive). This struck and lost limit is a measure voluntarily imposed by the Tribe to avoid excessive numbers of struck and lost animals while hunting.

If the struck and lost quota is met or exceeded, the Tribe proposes to stop hunting to allow the opportunity to reevaluate techniques and address potential problems.

Harassed

The Tribe recognizes that whales not harvested or struck in any hunt may be subject to harassment as defined in the MMPA (see Section 1.2.3.2, Section 101(a) Take Moratorium, for a definition of MMPA take, which includes both Level A and Level B harassment). Based on experience with whale hunts in 1999 and 2000, the Tribe estimates that there could be approximately 10 approaches and four unsuccessful harpoon attempts for every whale struck. The Tribe would classify unsuccessful harpoon attempts as Level A harassment, and it anticipates that no more than 28 gray whales would be subject to such harassment in any calendar year. The Tribe would classify approaches with no harpoon attempts as Level B harassment, and it anticipates that the number of whales subject to such harassment in any calendar year would not exceed 140.

Age and Reproductive Status

The Tribe proposes to prohibit the striking of a whale calf, or any whale accompanied by a calf. Gray whale calves generally accompany adult female parents during migration and may be observed as pairs of traveling whales.

2.3.3.2.3 Location of Hunt (Area Restrictions)

The area where the Makah Tribe proposes to hunt is confined to its U&A west of the Bonilla-Tatoosh line, excluding the Strait of Juan de Fuca. WAC 220-16-490 defines the Bonilla-Tatoosh Line as a line projected from the most westerly point on Cape Flattery to the lighthouse on Tatoosh Island, then to the buoy adjacent to Duntz Rock, then to Bonilla Point on Vancouver Island. The Makah's U&A, as adjudicated in *United States v. Washington* (1974 and 1985), also excludes grounds that the Makah historically hunted and fished, but that are now beyond the exclusive economic zone (EEZ), which is also the boundary between Canada and the United States. According to the Tribe's waiver request, restricting the hunt to the area of its U&A outside the Strait of Juan de Fuca, in conjunction with the proposed seasonal restrictions (Section 2.3.3.2.4, Timing of Hunt (Seasonal Restrictions), is designed to avoid any intentional harvest of gray whales identified within the PCFA survey area.

2.3.3.2.4 Timing of Hunt (Seasonal Restrictions)

The Makah's waiver request includes timing restrictions that would prohibit hunting from June 1 to November 30 in any calendar year. According to the Tribe's waiver request, this measure is "designed to avoid any intentional harvest of gray whales" that have been identified within the PCFA survey area by hunting outside of times that coincide with the summer feeding period.

2.3.3.2.5 Overview of Proposed Hunting Method (Element Common among Action Alternatives)

The Makah Tribe plans to use both traditional and modern methods for hunting whales to balance the preservation of traditional cultural methods, safety, and the need for increased hunting efficiency. Traditional and modern methods are relative terms because, as discussed in Section 3.9, Cultural Resources, the Tribe has developed technological innovations over time. The Tribe considers traditional methods to be those that would be maintained based on their contribution to the ceremonial value of whaling. The Tribe's request includes the use of modern equipment when needed for safety, increased technological effectiveness, and/or to meet MMPA permit requirements.

The proposed method includes hunting whales from one or two sea-going canoes, at least 30 feet long, and carved by the Makah. Each canoe would be manned by an eight-person whaling crew (all Makah tribal members) and would include a captain, harpooner, and paddlers. One or more chase boats, 24 feet long and powered by a minimum 200-horsepower engine capable of safely towing an adult gray whale, would accompany the canoes. Each chase boat would be manned by a pilot, diver, rifleman, backup harpooner, and at least one other crew member. Each chase boat would be equipped with a navigation system capable of fixing the vessel's position on the water.

Method of Striking and Killing

The harpooner would use stainless steel harpoons with a toggle point. Each harpoon would be secured to a rope with float(s) attached. The harpooner would use one or more harpoons to make the first strike on the gray whale. If a harpoon struck and affixed the toggle point and floats to the whale with the harpoon line attached, the rifleman in the chase boat would shoot it at close range with a specially developed, high-powered, .50-caliber-round rifle with the intent of killing the whale with a shot to its central nervous system. A diver would attempt to sew the whale's mouth shut to prevent the whale from sinking.

Optional Method of Striking and Killing

Although the Tribe proposed a specific method of striking and killing whales, public comments asked us to consider other methods. Rather than develop full alternatives to analyze other reasonable methods, this EIS considers optional methods of striking and killing whales that would be reasonable regardless of the action alternative. For this reason, although other options for striking and killing are not part of the Tribe's proposal, this EIS will examine an optional method as an element common among action alternatives, including the proposed action.

The optional method would involve striking whales with a hand thrown darting gun that fires an explosive projectile into the whale. The hand thrown darting gun consists of a barrel (to hold an explosive projectile) that is attached to a wooden shaft equipped with a toggle-point harpoon. The harpoon is intended to penetrate the whale and attach a line and float to secure the whale and assist in its recovery (O'Hara et al. 1999; Øen 2000; IWC 2007a). The barrel contains a trigger rod that ignites a propellant or 'pusher' charge. This pusher charge fires the explosive projectile into the whale's body. The explosive projectile has a time delay fuse. The explosive projectile may be either black powder or penthrite and is intended to kill when it explodes inside the whale, either through shrapnel or blast injury. The cervical and cranial thoracic regions are the critical targets for the darting gun projectile (O'Hara et al. 1999).

If the initial darting gun projectile (primary strike) fails to kill the whale, the whale would be killed with additional explosive grenades delivered using either a smooth-bore, eight-gauge shoulder gun or a darting gun.

Impacts on individual whales from each of the optional hunting methods are described in further detail in Section 3.4.3.6.1, Known and Potential Anthropogenic Impacts, Aboriginal Subsistence Whaling.

Securing and Towing the Whale

Following a successful harvest, the whaling crew would secure the whale with a line to tow it to a beach (mostly likely on the Makah Reservation). Once secured at the beach, tribal members could participate in celebrations and butchering, and tribal and NMFS biologists could conduct photographic analysis and tissue sampling. Most of the whale products from the beached whale would be removed within 24 hours, including tissue samples collected by biologists.

The Tribe proposes to conduct research and development to refine hunting methods further. After consultation with NMFS, the waiver request proposes that the Makah Whaling Commission be able to amend tribal regulations periodically to improve the safety, effectiveness, and humaneness of the gray whale hunt.

2.3.3.2.6 Whale Product Use and Distribution (Element Common among Action Alternatives)

Limited Commercial Use and Distribution

The Makah Tribe would not sell or offer for sale whale products to the extent prohibited in WCA regulations. 50 C.F.R. 230.4(f) prohibits any person from selling or offering for sale whale products taken from an aboriginal subsistence hunt, except for authentic articles of native handicraft. MMPA Section 102(f) prohibits take of whales incidental to commercial whaling. Although Section 101(b) of the MMPA allows Alaska Natives to sell edible whale products in native villages and towns in Alaska or for native consumption, the Makah would not sell or offer for sale any edible whale products. Any sales or offers to sell would be limited to non-edible whale products used to create authentic articles and native handicraft and clothing, including artwork, within the United States.

The Makah Tribe would prohibit tribal members who participate in any whale hunt from receiving monetary compensation, also in accordance with WCA regulations (50 CFR 230.4(e)).

Non-Commercial Use and Distribution

The Makah, within the borders of the United States, would be able to share whale products from any hunt (1) with relatives of participants in the harvest, (2) with others (*i.e.*, both non-relatives and relatives) in the local community, or (3) with persons in locations other than the local community with whom local residents share familial, social, cultural, or economic ties (see Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling, for provisions of the most current IWC Schedule and for the definition of subsistence use as adopted by consensus at the 2004 annual meeting).

2.3.3.2.7 Other Environmental Protection Measures

Seabirds

Tatoosh Island and White Rock (which are located within the coastal portion of the Makah's U&A) support large seabird breeding colonies (Section 3.5.3.2.2, Non-Listed Birds and Their Associated Habitats). The Tribe proposes to avoid striking whales within 200 yards of Tatoosh Island and White Rock during May to minimize disturbance to feeding and nesting sea birds. The Tribe has further proposed that it would not hunt from June 1 through November 30, which would also help to protect seabird breeding colonies.

Public Safety Measures and Enforcement (Element Common among Action Alternatives)

The Tribe proposes to conduct public safety measures at least as restrictive as those described in its 2001 Gray Whale Management Plan. Those measures include the public safety measures the Makah Tribe previously employed in the 1999 and 2000 hunts, as well as additional measures that the Tribe plans to use for future whale hunts. These are the measures (described in more detail in Section 3.15, Public Safety) proposed by the Tribe:

- The Makah Tribe whalers would use modern methods to take a whale quickly; this would reduce the potential for a wounded whale to injure hunters or people in other vessels.
- All whalers would participate in whaler safety training lessons and drug and alcohol testing (see Training and Certification Process for Tribal Whalers below).
- The whaling captain would also participate in captain training and certification. The captain would be responsible for the safety of his crew.
- Riflemen and/or whalers in charge of firing explosive charges would participate in training for proficient and accurate shooting under simulated hunt conditions.

- The rifleman or whaler in charge of firing explosive charges on board the chase boat would not be able to discharge his weapon until authorized to fire by a safety officer designated by the whaling captain. If a rifle were used, the safety officer would not authorize the discharge of the rifle unless the barrel of the rifle were above and within 30 feet from the target area of the whale, and the rifleman's field of view were clear of all persons, vessels, buildings, vehicles, highways, and other objects or structures that if hit by a rifle shot could injure humans or property.
- The whaling captain would suspend the hunt if visibility were less than 500 yards in any direction.
- The whaling canoe would have additional support boats available to provide first aid to whalers and help secure and tow the whale.
- All whaling equipment would be inspected before whaling.
- The Coast Guard would enforce the provisions of its permanent regulated navigation area (RNA) and moving exclusionary zone (MEZ), which would minimize the chance of bystanders accidentally being harmed during a hunt.

In the Tribe's waiver request, it indicates that it would comply with additional safety measures NMFS includes in an MMPA waiver, regulations, or permit. The plan also indicates that the Makah Department of Fisheries Management would work with the Coast Guard to close off the designated whale hunting area to recreational and commercial vessel traffic during the hunt.

Training and Certification Process for Tribal Whalers (Element Common among Action Alternatives)

If NMFS were to authorize hunting by waiving the MMPA moratorium on take, issuing regulations and any necessary permits, and publishing any quota in the Federal Register, the Makah would require all tribal members who engage in whaling to be under the control of a whaling captain holding another valid whaling permit (also referred to as a license) issued by the Makah Tribal Council (see Section 1.2.4.2, National Whaling Governance under the WCA, for an explanation of responsibilities held by Native American whaling organizations). Whaling permits issued by the council would incorporate and require compliance with all NMFS requirements, as well as tribal regulations. The regulations would also provide a training and certification process for all members who participate in whaling, as required by NMFS' WCA implementing regulations. Whaling team members may also partake in spiritual preparations.

The Makah Tribal Council would not issue a permit to a whaling captain unless it determined that the whaling captain and each whaling team member had been certified by the Makah Whaling Commission to perform his assigned role on the whaling crew.

Makah Department of Fisheries Management and NMFS Observers and Monitoring (Element Common among Action Alternatives)

The Makah Tribe's waiver request includes accommodations for both a Makah Department of Fisheries Management observer and a NMFS observer to accompany the whaling team in the chase boats. The Tribe would provide the designated NMFS observer with at least 24-hour notice of whaling permit issuance to the whaling captain by the Makah Tribal Council, unless the NMFS observer was already present on the Makah Reservation. The Tribe's request also indicates that the NMFS observer could collect specimen material from landed whales. This would include ovaries (as applicable), ear plugs, baleen plates, stomach contents, and other tissue samples. The Makah Department of Fisheries Management observer would be responsible for recording the time, date, location, and physical characteristics of each whale struck and, for each whale harvested, the body length, fluke width, sex, any fetus found in a landed whale, and the time to death for all whales harvested. The Tribe would have to report all monitoring data to NMFS annually.

Enforcement (Element Common among Action Alternatives)

Tribal regulations would include provisions requiring tribal enforcement of the regulations and permit terms and conditions NMFS adopted, if hunting were authorized. These regulations would include criminal sanctions, such as fines and imprisonment, up to the limits imposed by the Indian Civil Rights Act. Violators may also be barred from exercising treaty fishing, hunting, and/or whaling rights for up to three years. Makah Department Natural Resources Enforcement has been designated as the tribal law enforcement agency responsible for administering the requirements of whaling regulations and permits. A whaling captain would be responsible for any violations committed by a member of the whaling team under his control.

In the event of violations of NMFS' regulations governing any authorized hunt, federal enforcement would also be possible. Potential offenses could include violation of the WCA and MMPA and any implementing regulations.

2.3.4 Alternative 3 (Hunt Outside the Strait of Juan de Fuca with No Restrictions on Timing or Limits on Identified Whales)

Alternative 3 has the same area for the hunt as Alternative 2, but would eliminate timing and other restrictions on killing and landing identified whales. Thus, the Makah Tribe could hunt whales at any time of year and would not stop hunting based on the number of identified whales harvested. All other hunt conditions and restrictions described under Alternative 2 would be the same under Alternative 3.

This alternative provides information to help determine possible conservation benefits to gray whales and/or to the local environment resulting from two aspects of the Tribe's proposal that are intended to limit impacts on identified whales. These two aspects are as follows: (1) the Tribe's proposal to cease hunting if it lands a predetermined number of whales found in the photo identification catalog, and (2) the Tribe's proposal to limit the hunt to months associated with the northward and southward migrations, when fewer identified whales are present in the PCFA and ORSVI survey areas, and more of the whales present are likely to be migrating whales not previously identified in the survey areas.

By removing the additional limits for identified whales, this alternative explores the cultural and social impacts on the Tribe of imposing that additional restriction, as well as the impacts on other social and economic values. Removing the timing restrictions also helped illuminate effects of hunt timing on Makah cultural and social values, public and hunter safety, aesthetics, and other social and economic values.

2.3.5 Alternative 4 (Sanctuary and National Wildlife Refuge Resource Alternative)

Alternative 4 would have the same conditions as Alternative 2, except that it would also prohibit vessels associated with any Makah hunt (including Makah vessels and associated protest, media, and law enforcement vessels) from entering the 200-yard voluntary exclusionary zone that the United States Fish and Wildlife Service has established around all rocks or islands comprising the Washington Islands National Wildlife Refuges.

This alternative explores the conservation benefits to Sanctuary and National Wildlife Refuge resources, specifically seabirds and hauled-out marine mammals, resulting from vessel and air traffic associated with the hunts. Although this alternative would generally prevent vessel entry and striking a whale within the 200-yard exclusionary zone, the Makah hunters and chase boats would have to follow any struck whale (attached to the canoe by harpoon lines) into the 200-yard zone to dispatch it.

2.3.6 Alternative 5 (Hunt Outside the Strait of Juan de Fuca with No Restrictions on Timing, More Restrictive Numbers [Harvested, Struck, and Struck and Lost], and No Limits on Identified Whales)

Alternative 5 would have the same hunt area as Alternative 2, but would differ by eliminating timing restrictions and the restrictions on landing identified whales, as well as imposing additional restrictions on the total number of whales harvested, struck, and struck and lost. The restrictions on numbers of whales would be (1) no more than two harvested whales annually and no more than 10 harvested whales in any five-year period, (2) no more than three annual strikes and no more than 12 strikes in any five-year period, and (3) no more than one struck and lost whale annually and no more than four struck and lost whales in any five-year period. Thus, the Makah Tribe could hunt whales at any time of year and would not stop hunting based on the number of identified whales landed, but would be allowed to harvest, strike, and strike and lose fewer numbers of whales than included in its waiver request and allowed under the current annual and five-year IWC catch limits set in the Schedule for the ENP gray whale stock and allocated by bilateral agreement between the United States and the Russian Federation.

This alternative explores the conservation benefit to gray whales and/or to the local environment inherent in reducing the total numbers of whales harvested compared with limiting the hunt based on photo identification and area and seasonal restrictions. It also addresses the environmental and socioeconomic benefits of limiting the total numbers of whales hunted and the cultural and social impacts of decreased landings and strikes on the Makah Tribe.

2.3.7 Alternative 6 (Hunt Anywhere in the U&A with No Restrictions on Timing or Limits on Identified Whales)

Alternative 6 is the same as Alternative 3, except that the Tribe could hunt throughout its entire U&A, including the Strait of Juan de Fuca. Similar to Alternatives 3 to 5, there would be no harvest limitations specifically for identified whales.

This alternative reviews the cultural and social impact on the Makah Tribe of allowing it to hunt throughout its entire U&A, as the Tribe hunted whales for the past 1,500 years. This alternative also addresses (1) the impact on conservation of gray whales and/or the local environment of allowing hunting in the Strait of Juan de Fuca with no time limits; (2) the impact on aesthetic and other social and economic aspects of hunting in the Strait; (3) the impact to the Tribe of allowing hunting in its entire U&A, including the safety of the hunters if they hunted in the Strait of Juan de Fuca compared to the open ocean; and (4) the public safety impacts of a hunt in the Strait of Juan de Fuca.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

During the scoping process of this EIS, NMFS reviewed several alternatives and/or options within alternatives, but eliminated them from further detailed analysis. The reasons why specific alternatives were eliminated from further study are explained below.

2.4.1 Non-Lethal Hunt

The non-lethal hunt alternative was requested by some members of the public. The commenters did not fully describe the details of this alternative, but it would likely include the Tribe engaging in some ceremonies and training preparatory to a hunt, a pursuit of whales on the water, and a mock attack on a whale, but would not culminate in a whale being killed or transported to shore. Federal treaties and statutes are important in informing and identifying reasonable alternatives. Under the WCA and implementing regulations, whaling (which is synonymous with hunting in the aboriginal subsistence use context) clearly contemplates killing and attempts to kill whales (16 USC 916(j) and 50 CFR 230.2). Likewise, the definition of take under IWC and the MMPA contemplates lethal takes (16 U.S.C. 1362(13); 50 CFR 216.3). Furthermore, the right of fishing and of whaling or sealing was secured by the Makah through the 1855 Treaty of Neah Bay, which was written when fishing and whaling or sealing conveyed the opportunity to take animals lethally from each of these categories.

The Tribe's waiver request seeks authorization to kill whales under those existing legal authorities and its interpretation of the scope of its treaty. The non-lethal hunt alternative contemplates, in effect, the No-action Alternative. As such, the impacts of this alternative are similar enough to those of the No-action Alternative so that its detailed analysis would not provide additional information to inform agency decision-making or the public's consideration. The conservation impacts on gray whales and the local ecosystem would be the same as the No-action Alternative because no gray whales would be removed from the population or from the ecosystem. The impact to the Makah would be the same as the No-action Alternative, because they would not be allowed to hunt whales according to their historical and contemporary cultural understanding or within their understanding of the scope of their treaty right. In this respect, a non-lethal ceremonial hunt would not meet the Makah Tribe's purpose and need. The other social and economic impacts would be the same as the No-action Alternative because a non-lethal hunt would not have significantly different public safety, aesthetic, sentimental, or economic impacts than no hunt. Moreover, if a non-lethal hunt were to be analyzed in detail, the MMPA waiver process would apply because harassment of a live animal (which would likely occur under a ceremonial hunt) would be considered a take under the MMPA.

2.4.2 Subsistence Use of Drift Whales

On July 16, 1995, a female gray whale was found entangled and drowned in a tribal marine set net salmon fishery in the Strait of Juan de Fuca outside of Neah Bay. NMFS biologists and the tribal fisherman who discovered the whale removed the carcass from the net, and the Tribe butchered the whale for subsistence use before the meat spoiled. All tribal marine set nets were removed. The Makah Tribal Council issued a press release clarifying that it did not authorize any tribal member to net a whale and intended to seek permission to conduct a ceremonial and subsistence harvest (Makah Tribal Council 1995b). The Tribe also indicated that it would continue to work with NMFS to minimize taking of marine mammals in set nets. A NMFS report indicated that there were at least four incidences of gray whale entanglements over the last 15 to 20 years (Angliss and Outlaw 2008). The use of the female gray whale for subsistence represents the first time in recent times the Makah Tribe sought to exercise its treaty rights for tribal consumption (NMFS 1995). Several commenters suggested that the Makah use drift whales (also known as stinker whales), rather than live whales, for subsistence purposes. Drift whales are whales that die naturally or as a result of some human activity other than a directed hunt (for example, entanglement in fishing gear). This alternative is essentially the same as the No-action Alternative. The conservation impacts on gray whales and the local ecosystem would be the same as those under the No-action Alternative, because no gray whales would be removed from the population or from the ecosystem as the result of a hunt. The social and cultural impacts on the Makah would be the same as those under the No-action Alternative, because they would not be allowed to hunt whales according to their historical and contemporary cultural understanding and within their concept of the scope of their treaty right. In this respect, a decision allowing only subsistence use of drift whales would not meet the Makah Tribe's purpose and need.

While this alternative would differ from the No-action Alternative because it would provide the Makah with an occasional and unpredictable supply of whale products, the agency could provide for the Tribe's use of drift whales without invoking the MMPA waiver provision (NOAA and Makah Indian Tribe 1989). The other social and economic impacts would be the same as those under the No-action Alternative, because the subsistence use of drift whales would not have significantly different public safety, sentimental, or economic impacts than a no-hunt alternative.

The use of drift whales might have an impact on aesthetics, but some of that impact (the sight of a dead whale being butchered on the beach) would be the same as in any of the action alternatives.

2.4.3 Hunt Other Marine Mammal Species Traditionally Hunted by the Tribe

This alternative, which was suggested by some members of the public, would substitute a gray whale hunt with a hunt for a different whale species or another marine mammal. Because the United States has not requested on behalf of the Makah that the IWC set aboriginal subsistence whaling catch limits for another large cetacean, and because the IWC has not considered such a request, the WCA precludes NMFS from publishing a quota for other whale species for the use of the Makah Tribe. In addition, some whales, such as the humpback whale and some marine mammal species (such as Steller sea lions), are listed under the Endangered Species Act (ESA).

Also, if non-ESA listed marine mammal species, such as pinnipeds or small cetaceans (e.g., dolphins and porpoises), were entirely or partially substituted for a gray whale, the total biomass harvested and the method used would likely differ (i.e., more individuals caught using different catch methods). As explained in Section 3.9, Cultural Resources, whaling and sealing do not hold equivalent historical or contemporary ceremonial and subsistence harvest values for the Makah Tribe. These differences would include the type of food obtained (blubber, meat, and whale bone), associated spiritual ceremonies, hunting activities (methods, timing, and area), and subsistence uses. In this respect, a decision requiring substitution of other marine mammal species in lieu of gray whales would not meet the Makah Tribe's purpose and need. The Makah's request is to exercise its treaty right to whale. A hunt focused on non-ESA listed pinnipeds and small cetaceans would be a different type of action, and it is too speculative to allow for an EIS analysis.

2.4.4 Change the Hunt Location

NMFS considered other alternatives for either increasing or decreasing the Makah gray whale hunting area. Hunt location options that were considered but eliminated from further study are described in the following sections.

2.4.4.1 Hunt Outside the OCNMS but Within the U&A

This option would allow the Makah to hunt whales only within the Strait of Juan de Fuca and a small portion of the Tribe's U&A seaward of the outer Olympic Coast National Marine Sanctuary (OCNMS) boundary (Figure 1-1). Alternative 6 would include hunting within the Strait of Juan de Fuca; thus, it captures that portion of this alternative option. The area off the coast of Washington that is outside the Strait of Juan de Fuca and the OCNMS but is within the

Makah U&A is too small to provide for a successful hunt and is beyond the 30-mile offshore area where most whales migrate past Washington (see Section 3.4.3.3, Distribution and Habitat Use, for more information). In addition, ocean conditions are more challenging further offshore, making the hunt more difficult and hazardous when considering public safety.

Although the purpose of this alternative is to safeguard the natural resource values that led to designation of the OCNMS as a national marine sanctuary, OCNMS regulations allow for a Makah tribal hunt if otherwise legally permitted (15 CFR 922.152(a)(5)). OCNMS regulations allow for taking marine mammals pursuant to any treaty with an Indian tribe, as long as the taking is consistent with the MMPA, ESA, and Migratory Bird Treaty Act (16 USC 1431 *et seq*.). Alternative 4 is intended to be an alternative that would allow us to consider Sanctuary resources in greater detail. An alternative to hunt outside the Sanctuary was eliminated from detailed consideration because portions of it are already being analyzed (hunt in the Strait of Juan de Fuca), and the portion not already being analyzed (hunt seaward of the OCNMS boundary) is impracticable and not designed to protect identifiable gray whales.

2.4.4.2 Hunt Outside of Areas Frequented by Identified Whales

Identified whales have been observed in the Makah's U&A, an area that is within the PCFA and ORSVI survey areas, year-round. There is no area within the Makah U&A that is not potentially frequented by identified whales.

2.4.4.3 Hunt in Russia with Chukotka Natives

Members of the Makah Tribe currently have the option of hunting with the Chukotka Natives. Only those Makah Tribe members who participate in the hunt in Russia would have the opportunity to share in the ceremonial and subsistence value of the hunt because, by international law (Convention on the International Trade of Endangered Species), no whale products may be transferred out of the country of origin. Under the MMPA, in addition to international law, importing a marine mammal product without receiving authorization under the waiver process would be illegal. This option would not allow the Makah Tribe to conduct a ceremonial hunt in its U&A using traditional Makah practices, nor would most of the tribal members be able to participate in celebrations that occurred when a whale was landed in Russia. This option would not meet the Tribe's stated purpose and need to exercise its cultural values or treaty right. This option would require no action on the part of NMFS; therefore, it is similar to the No-action Alternative. Analysis of this alternative would not provide the agency or the public with information useful in informing NMFS's decision, since this alternative would require no decision on the agency's part.

2.4.5 Employ Different Hunting Methods

During the scoping process, NMFS identified the following methods of striking and killing whales, based on the Tribe's request, internal scoping, public comments, and an examination of aboriginal subsistence hunting world-wide: 1) a toggle point harpoon to strike the whale and a .50 caliber rifle to kill the whale (as proposed by the Tribe); 2) a darting gun with explosive projectile as the striking and/or killing weapon; 3) a shoulder gun with explosive projectile as the killing weapon; 4) traditional methods only (harpoons to strike whales and lances to kill whales); and 5) a smaller caliber rifle as the killing weapon. The following sections explain NMFS' rationale for not analyzing options 4 and 5 in detail. The other options are analyzed in detail as an element in common among the action alternatives.

2.4.5.1 Hunt Using Only Traditional Methods

This alternative, suggested in public comment, is best characterized as requiring the Makah to hunt using only pre-contact hunting methods. This would mean, for example, using mussel-tipped harpoons instead of toggle-point or steel-tipped harpoons, prohibiting the use of rifles to kill whales, and prohibiting the use of chase boats with outboard motors to follow the hunt and to tow whales. More information about pre-contact Makah hunting techniques can be found in Section 3.10.3.4, Makah Historic Whaling.

This alternative was eliminated from detailed consideration for a variety of reasons. As stated above in Section 2.3.2, Elements Common among Action Alternatives, the information presented in this EIS related to the method of the hunt must support and inform the agency's future decisions about waiving the MMPA moratorium or issuing a permit. The agency may only issue a permit to take a marine mammal upon a determination that the manner of taking is humane (16 USC 1374(b)(2)(B)), which the MMPA defines as "the least possible degree of pain and suffering practicable" (16 USC 1362(4)). A whale may take several hours or days to die using only pre-contact methods. Modern technologies, such as those analyzed in detail in this EIS, result in quicker times to death. Hunting using only pre-contact methods would not result in the least possible degree of pain and suffering practicable.

WCA regulations also require that hunting not be conducted in a wasteful manner, "which means a method of whaling that is not likely to result in the landing of a struck whale or that does not include all reasonable efforts to retrieve the whale" (50 CFR 230.2). The use of powered vessels and backup hunters (e.g., harpooners and the rifleman) to chase and tow whales represent reasonable efforts to retrieve any stricken whale and are more likely to meet WCA regulatory requirements than hunting using only traditional vessels.

Safety of hunters and the public must also be considered. A wounded whale experiencing a lengthy death could pose a greater risk to the whaling crew and public. This situation can be avoided by using some modern tools.

This alternative also does not meet the Makah's purpose and need. Requiring the Makah to hunt with pre-contact weapons, boats, and other tools is not justified because technologies, including using steel-tipped harpoons and accepting tows from steam-powered commercial tow boats, were used in traditional hunts as they became available.

2.4.5.2 Kill Whales with Smaller Caliber Rifles

Many of the aboriginal subsistence whale hunts conducted worldwide on large whales employ rifles to kill whales; some of these rifles are smaller than the .50 caliber rifle in the Proposed Action and the .577 caliber rifle used in the Makah's 1999 hunt. Three separate reports (Ingling 1999; Beattie 2001; Graves et al. 2004) have now examined humane killing and public safety aspects of the proposed Makah whale hunts, and all three authors concluded that a .50 caliber rifle (or greater) is the appropriate caliber of weapon to use. Specifically, Ingling (1999) concluded that for large game, larger bullets are more effective in producing penetration deep enough to reach a vital organ or disabling site in the animal and, thus, require more power (i.e., heavier guns); in addition, rifles that are at least .50 caliber provide a better margin of error in targeting compared to smaller caliber rifles. Graves et al. (2004) added that "small caliber rifles simply will not do the job" of quickly killing large thick-boned whales; they concluded that the .50 caliber weapon was the best choice. Russian government reports on the number of small-caliber rifle rounds fired per whale in the Chukotka Native gray whale hunt support this conclusion (Section 3.4.3.5.4, Method of Killing and Time to Death). It is also supported by the decision of New Zealand to euthanize stranded whales as the most humane method (IWC 2007a). The Ingling and Graves reports are discussed in further detail in later sections of this EIS (Section 3.15, Public Safety). As described in Section 2.4.5.1, Hunt Using Only Traditional Methods, the MMPA prescribes that taking a marine mammal must involve "the least possible degree of pain and suffering practicable" (16 USC 1362(4)). Smaller caliber rifles would not result in the least possible degree of pain and suffering practicable.

2.4.6 Alternative Compensation to the Makah Tribe

Compensation to the Makah Tribe for not whaling could be monetary, including financial support for a different venture (such as ecotourism associated with whale watching). Other types of compensation might be a loan for a casino resort, new facilities for health care improvements, other options for improving the quality of life on the reservation, or renegotiating the treaty and returning ceded lands. Any of these actions would, however, result in environmental conditions similar to those described under the No-action Alternative. No whale hunting would occur, and the other financial incentives (such as loans for casinos, resorts, improved health care, or ecotourism opportunities) would be provided to the Tribe with its agreement that the Tribe would forego future whaling. The No-action Alternative could occur at any time and would not be restricted to a specific future event. The Tribe was offered financial compensation by a private party in lieu of whaling during the fall of 1998. The Tribe, at that time, would not consider this offer, and the tribe has maintained that position (Makah Tribe, pers. comm., 2006). This alternative was eliminated from further consideration because any of these activities would be speculative, with uncertain negotiations between the Tribe and other government and nongovernmental entities.

2.5 Alternative Comparison by Key Concern

An alternative comparison draws together the conclusions from the information and discussion presented throughout this EIS and provides the result of the analysis in a brief summary. Table 2-2 provides quantitative and qualitative comparisons of the alternatives for each of the key concerns. The following EIS sections compare alternatives by key concerns and environmental consequences.

Alternative 1 is the baseline for comparing the action alternatives. Chapter 3 provides information on the existing condition of each resource, and Chapter 4 provides the environmental effects from implementing the proposed action by resource. Within each resource, effects are compared among alternatives, including the No-action Alternative.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES

RESOURCES	Alternative 1 No-action	Alternative 2 Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	Alternative 3 Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	Alternative 4 Sanctuary and National Wildlife Refuge Resource Alternative	Alternative 5 Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	Alternative 6 Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
WATER QUALITY						
Drinking Water Sources	Current risk levels would continue.	No likely effect	Similar to Alternative 2	Similar to Alternatives 2 and 3	Similar to Alternatives 2-4	Similar to Alternative 2-5
Marine Waters	Current risk levels would continue (includes occasional disposal of drift whale carcasses).	Increased vessel traffic creates increased risk of fuel spills, but spills would be rapidly diluted. Spills could also be mitigated by modifying existing spill response plans. Negligible increased risks from disposal/leakage of whale carcasses.	Greater contamination risks than Alternative 2 due to increased days of hunting and likely increase in number of whales. Spills would be rapidly diluted and risk from whale carcasses would be negligible. Spills could also be mitigated by modifying existing spill response plans.	Similar to Alternative 2	Similar risk of fuels spills to Alternative 2 due to similar number of days of hunting. Lower risk of leakage from whale carcasses due to fewer numbers of potential whales killed.	Similar to Alternative 3
Shellfish Beds	Current risk levels would continue.	Negligible increased contamination risks from leakage of landed whale carcasses.	Greater contamination risks than Alternative 2 due to more whales possibly landed. Risks still negligible.	Similar to Alternative 2	Lower contamination risk than Alternatives 2, 3, 4, and 6 due to fewer whales landed.	Similar to Alternative 3

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
MARINE HABITAT AND SPECIES						
Pelagic Species and Communities	Current levels of disturbance would continue.	Increased vessel traffic, carcass hauling, could result in local, short-lived disturbance of fish, zooplankton, and other pelagic species. No appreciable ecological effects.	Potentially greater impacts than Alternative 2 due to increased days of hunting, but disturbances and ecological effects are still expected to be localized and short-lived, with no appreciable effects.	Similar to Alternative 2, although the potential for disturbance would decline near protected rocks and islands.	Similar to Alternatives 2-4 although greater restrictions on numbers of whales would likely reduce any disturbances.	Similar to Alternative 3, but with any disturbances distributed over a broader area.
Benthic Species and Communities	Current levels of disturbance would continue.	Increased vessel traffic, carcass hauling, could result in local, short-lived disturbance of marine plant, macroalgal, shellfish, and other benthic species. No appreciable ecological effects.	Potentially greater impacts than Alternative 2 due to increased days of hunting, but disturbances and ecological effects are still expected to be localized and short-lived, with no appreciable effects.	Similar to Alternative 2, although the potential for disturbance would decline near protected rocks and islands.	Similar to Alternatives 2-4 although greater restrictions on numbers of whales would likely reduce any disturbances.	Similar to Alternative 3, but with any disturbances distributed over a broader area.
ENP GRAY WHALE						
ENP Gray Whale Stock	Current IWC-set harvest levels would continue. ENP gray whale stock is likely to remain at or near carrying capacity.	No discernable impacts because overall harvest would remain at IWC-set harvest levels.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
ENP GRAY WHALE (continued)						
Gray Whales Using Local Survey Areas - Abundance	No hunting would occur in local survey areas.	Likely 1 (maximum of 4) Makah U&A or PCFA whale killed. One killed per year would likely be replaced in subsequent year and would not exceed PBR. If maximum of four killed, may not be replaced in subsequent year and would exceed PBR by 1.5 whales at current abundance levels. Concerns about exceeding PBR could be addressed by reducing the number of struck and lost whales allowed or adding a restriction on the combined number of (1) whales struck and lost and (2) identified whales killed and landed.	Potentially 7 Makah U&A or PCFA whales killed because all seven strikes are assumed to result in death and year-round hunting could result in all seven whales being Makah U&A whales. Seven killed whales would not likely be replaced in the Makah U&A in subsequent year and would exceed PBR by 4.5 whales per year at current abundance levels.	Similar to Alternative 2.	Potentially 3 Makah U&A or PCFA whales killed because all three strikes are assumed to result in death and year-round hunting could result in all three whales being Makah U&A whales. Three killed whales may not be replaced in subsequent year and would exceed PBR by 0.5 whales at current abundance levels.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
ENP GRAY WHALE (continued)						
Gray Whales Using Local Survey Areas - Distribution and Habitat Use	Distribution and habitat use would continue to be determined solely by prey availability.	Whales may move within or leave Makah U&A to avoid hunt-related activities over the short or long term. Concerns about whales abandoning Makah U&A could be addressed by monitoring and/or limits on whales approached, pursued, or subjected to unsuccessful strikes.	Greater potential than Alternative 2 for whales to avoid Makah U&A over the short or long term because of the increased number of days of hunting and because more hunting is likely during the summer feeding period.	Similar to Alternative 2.	Potentially less than impacts predicted under Alternatives 3 and 6 due to greater hunt restrictions.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
ENP GRAY WHALE (continued)						
Individual Whales	124 whales could be killed in Chukotkan hunt annually on average, experiencing manner and time to death associated with that hunt. Approx. 5 percent would be struck and lost.	On average, four whales annually could be killed in a Makah hunt rather than Chukotkan hunt. Manner and time to death would be similar to Chukotkan hunt (Alternative 1). As many as 43 percent of the 4 could be struck and lost, compared to 5 percent under Alternative 1. Concerns about the proportion of whales struck and lost could be addressed by reducing the number of struck and lost allowed.	Similar to Alternative 2, except that year-round hunting season could reduce time to death because some hunting would likely occur under more favorable weather and ocean conditions, improving the accuracy of Makah riflemen.	Similar to Alternative 2.	Half as many whales could be killed in a Makah hunt rather than Chukotkan hunt. Year-round hunting season could reduce time to death compared to Alternatives 2 and 4 because some hunting would likely occur under more favorable weather and ocean conditions, improving the accuracy of Makah riflemen. As many as 33 percent could be struck and lost, compared to the 5 percent under Alternative 1	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	Alternative 1 No-action	Alternative 2 Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	Alternative 3 Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	Alternative 4 Sanctuary and National Wildlife Refuge Resource Alternative	Alternative 5 Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	Alternative 6 Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
OTHER WILDLIFE						
Marine Mammals	Current levels of disturbance would continue.	Hunt-related activities would increases the number of vessels, aircraft and noise in the project area. Chance of disturbance is low because of size of project area, location of haul-outs relative to hunts, and lack of association with gray whales (except killer whales). Any disturbance would be temporary and localized. Injury from vessel collision is unlikely.	Potentially greater impacts than Alternative 2 due to increased hunting opportunities, but any disturbances are expected to be localized and short-lived.	Similar to Alternative 2, although the potential for disturbance would decline near protected rocks and islands.	Similar to Alternative 2 although greater hunt restrictions would likely reduce any risks to marine mammals.	Similar to Alternative 3 although greater hunt restrictions would likely reduce any risks to other marine mammals. The ability to hunt in the summer and over a broader area might pose a greater risk of adverse effects on some species (e.g., sea otters).

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
OTHER WILDLIFE (continued)						
Other Marine Wildlife	Current levels of disturbance would continue.	Hunt-related activities would increase the number of vessels, aircraft and noise in the project area over a period of 7-30 days. Disturbance varies among species and habitat associations and in most cases would be localized and temporary. Most serious impact would be nest abandonment. Tatoosh and White Rock Islands would have buffers. Concerns about nest abandonment could be addressed by including buffers around other rocks and islands (as under Alternative 4).	Similar types of impacts as Alternative 2, but year-round hunting would increase the number of days (40 versus 7-30) and seasons during which activities occur. Disturbance could occur across more of species' life cycles. On the other hand, some hunting would occur in summer and fall when birds are no longer nesting, reducing chance of nest abandonment. Disturbances would be localized and temporary.	Similar to Alternative 2, except the potential for disturbance would be less to other wildlife on or near protected rocks and islands.	Similar types of impacts as Alternative 2, with similar number of days (20 versus 7-30). As with Alternative 3, year-round hunting would increase the seasons during which activities occur, with similar effects, but for fewer days (20 versus 40).	Similar to Alternative 3, except the ability to hunt in the Strait of Juan de Fuca would result in disturbance in that area, reducing the number of days of disturbance in the coastal portion of the Makah U&A.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
ECONOMICS						
Tourism	No opportunity for Tribe to promote hunt-related tourism and no likelihood of hunt-related boycott. Potential for small disproportionate effect on Tribe.	Ability to hunt creates opportunity for Tribe to promote hunt-related tourism. Also potential for hunt-related boycott.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 3.
Household Use of Whale Products	Current limited availability of drift whales and whales incidentally caught in fishing operations (potentially one whale every five years).	Products from up to four whales annually would be available for household consumption, manufacturing, and selling of traditional handicrafts.	Similar to Alternative 2 but year-round hunting would make it more likely the full number of whales could be harvested.	Similar to Alternative 2.	Products from up to 2 whales annually would be available for household use, compared to up to 4 whales under Alternatives 2, 3, 4, and 6.	Similar to Alternative 3.
Whale-watching Industry	Current levels of revenues from, and employment in, whale-watching industry would continue.	Level of gray whale harvest under Alternative 2 would not be expected to change whale-watching interest or opportunities and therefore not likely to affect whale-watching revenues or employment.	Similar to Alternative 2.	Similar to Alternative 2.	Potentially less than Alternative 2 due to hunting restrictions.	Similar to Alternative 2.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	Alternative 1 No-action	Alternative 2 Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	Alternative 3 Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	Alternative 4 Sanctuary and National Wildlife Refuge Resource Alternative	Alternative 5 Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	Alternative 6 Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
ECONOMICS (continued)						
Shipping and Ocean Sport/Commercial Fishing	Current passage conditions for ships and fishing vessels would continue.	Activating a MEZ during 7-30 days of hunting could temporarily disrupt shipping/fishing traffic, but no substantial economic impacts would be expected.	Potentially greater impacts than Alternative 2 due to additional days of hunting (40 versus 7-30) and greater number of times MEZ is activated. In addition, hunting could occur in summer when more recreational fishing vessels could be affected by MEZ.	Similar to Alternative 2.	Similar number of days of hunting as Alternative 2 (20 versus 7-30), resulting in similar potential for MEZ to be activated. As with Alternative 3, hunting could occur in summer when more recreational fishing vessels could be affected by MEZ.	Similar to Alternative 3.
Management and Law Enforcement	No change from current conditions.	Costs would be incurred for a hunt observer, and for federal, tribal, state, and local law enforcement agents and resources (e.g., helicopters and boats) to monitor the hunt and manage any protest activities.	Compared to Alternative 2, more days of hunting (40 versus 7-30) would increase the potential costs of law enforcement and hunt monitoring.	Similar to Alternative 2.	Similar to Alternative 2, there would be about the same number of days of hunting and similar levels of law enforcement and hunt monitoring.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
ENVIRONMENTAL JUSTICE						
Economics	Current levels of tourism would continue. Current occasional household use of products from drift whales and whales incidentally caught in fishing operations (potentially one whale every five years).	Potential for short term increase in level of visitors to Neah Bay during 7-30 days of hunting. Other visitors might avoid Neah Bay because of hunt. Long-term effects on number of visitors uncertain. Household use of products from up to four whales.	Potentially greater number of visitors in short term than Alternative 2 due to additional days of hunting (40 versus 7-30) and hunting during summer. Some visitors might avoid Neah Bay because of hunt. Long-term effects on number of visitors uncertain. Greater chance the full number of whales could be harvested and available for household use.	Similar to Alternative 2.	Similar number of visitors to Neah Bay as Alternative 2 due to similar number of days of hunting (20 versus 7-30). Household use of products from two whales versus four under Alternative 2.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
ENVIRONMENTAL JUSTICE (continued)						
Ceremonial and Subsistence Resources	Current limited availability of drift whales and whales incidentally caught in fishing operations (potentially one whale every five years). Lack of access to resource has disproportionate impact on Tribe.	Consistent with Makah's stated need for access to ceremonial and subsistence resources.	Similar to Alternative 2.	Similar to Alternative 2.	Harvest limits (two whales rather than four per year) would provide less access to ceremonial and subsistence resources.	Similar to Alternative 2.
Social Environment	Potential for tension between Makah Tribe and others, including federal government.	Potential for tension between Makah Tribe and others. Potential for social bonding among some tribal members and tension among others. Native Americans generally might be reassured by U.S. support for traditional tribal activity.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	Alternative 1 No-action	Alternative 2 Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	Alternative 3 Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	Alternative 4 Sanctuary and National Wildlife Refuge Resource Alternative	Alternative 5 Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	Alternative 6 Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
ENVIRONMENTAL JUSTICE (continued)						
Public Safety	No change from current conditions.	Increased potential for hunt-related injury falls disproportionately on tribal members (but risk is voluntarily assumed by Tribe).	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 3.
SOCIAL ENVIRONMENT						
Makah Tribal Members, Other Tribes, and Other Individuals and Organizations	Likely no protests and related social tensions. No change from current level of tension between members opposed to the hunt and those supporting it. The latter may feel continued frustration with U.S. government.	Tension could increase between hunt opponents and supporters, with opponents likely to protest. Supporters are likely to feel reassured by U.S. government support for traditional tribal activity.	Similar to Alternative 2, although additional hunting opportunities could result in more opportunities for protest and greater tension between hunt opponents and supporters.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
CEREMONIAL AND SUBSISTENCE RESOURCES						
Subsistence Use	Tribe could pursue some subsistence uses of whales (such as using drift whales or whales incidentally caught in fishing operations), but they would have limited cultural value if not practiced in connection with actual whale hunts.	Compared to No-action Alternative, increased subsistence use of whales due to opportunity to hunt (likely 7-30 days of hunting opportunity) and opportunity to process, share and consume up to average of four whales per year (maximum of five).	Similar to Alternative 2, but subsistence use would increase because year-round hunting would allow for more days of hunting (40 versus 7-30) and result in greater opportunity to harvest the full number of whales allowed.	Similar to Alternative 2.	Similar to Alternative 2 in number of days whales could likely be hunted (20 days versus 7-30), but lower limit on numbers (two versus four) creates less opportunity to harvest, process, share and consume whales.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
CEREMONIAL AND SUBSISTENCE RESOURCES (continued)						
Traditional Knowledge and Activities	Tribe could continue to engage in many related activities, and could apply and transmit relevant knowledge, but this would have limited cultural value if divorced from actual whale hunts. Application and transfer of knowledge related to actual hunting would be limited to discussions of past whale hunting,	Tribe could engage in full range of activities and apply the full range of knowledge associated with whale hunting, including searching for, striking, killing, towing, processing, sharing and consuming whales.	A year-round hunting season would provide Makah hunters with a greater opportunity to harvest whales, enabling them to hunt during traditional times without regulations restricting them to a season dominated by inclement weather conditions.	Similar to Alternative 2.	Similar to Alternative 2 in number of days whales could likely be hunted (20 days versus 7-30), but lower limit on numbers (two versus four) creates fewer opportunities to engage in traditional activities and apply and transmit traditional knowledge.	Similar to Alternative 3.
Spiritual Connection to Whaling	Spiritual connection to whaling would continue to be limited to connection to past whale hunting and spiritual connection may eventually wane.	Spiritual connection to whaling would be current and ongoing.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
CEREMONIAL AND SUBSISTENCE RESOURCES (continued)						
Cultural Identity	Tribal identity could erode in the absence of opportunities to participate in an activity central to Makah cultural identity.	Makah whale-hunting rituals, spiritual training, songs, dances, and ceremonial activities could increase over current conditions, and regularly recur, reinforcing Makah cultural identity. The opportunity to regularly harvest, process, share, and consume whale products could increase tribal members' sense of community. The whale-hunting ceremonies could provide an additional social framework, which could contribute to community social and spiritual stability.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
NOISE						
Noise Levels at Receiving Properties	No change from current conditions.	Increased noise levels from vessels, aircraft, and weapons at receiving properties in Neah Bay and possibly along State Route 112 east of Neah Bay during a period of 7-30 days. Noise may also be audible to recreational users in hunt vicinity. Limited number of recreational visitors may be affected because hunting would occur in winter and early spring when visitation is low.	Compared to Alternative 2, more days of hunting (40 versus 7-30) would result in increased noise. More recreational visitors would be exposed to noise because hunting would occur during summer.	Similar to Alternative 2.	Similar to Alternative 2, there would be about the same number of hunting days (20 versus 7-30) of increased noise levels at receiving properties. However, similar to Alternatives 3 and 6, hunting could occur year round, affecting more recreational visitors.	Similar to Alternative 3, there would be about the same number of days of hunting (40) and hunting would occur year round. More noise could occur at receiving properties along State Route 112 because hunting would be allowed in the strait. Recreational visitors in the strait would be exposed to more noise than under Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
AESTHETICS						
On-scene Observers	Current lack of opportunity to view an authorized whale hunt would continue.	Harvest of four whales during a period of 7-30 days would be visible to observers at beaches and vantage points along coastal portion of project area. Hunting during winter/spring period when visitation is low would reduce number of unintentional observers.	Compared to Alternative 2, more days of hunting (40 versus 7-30) and hunting during the summer would increase the chance that on-scene observers could see a whale being hunted, brought to shore, or butchered.	Similar to Alternative 2.	Similar to Alternative 2, there would be about the same number of days of hunting (20 versus 7-30), but because hunting would occur during the summer (similar to Alternatives 3 and 6), more on-scene observers might unintentionally observe a whale being hunted, brought to shore, or butchered.	Similar to Alternative 3, there would be about the same number of days of hunting (40) throughout the year. The potential for recreational visitors to view a hunt would extend to the Strait of Juan de Fuca.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** No-action	**Alternative 2** Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	**Alternative 3** Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	**Alternative 4** Sanctuary and National Wildlife Refuge Resource Alternative	**Alternative 5** Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	**Alternative 6** Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
AESTHETICS (continued)						
Media Observers	Current lack of opportunity to view an authorized whale hunt would continue.	Any whale hunts would receive media coverage. However, inclement weather during the hunt period could limit media coverage.	Any whale hunts would receive media coverage. Compared to Alternative 2, more days of hunting (40 versus 7-30) and hunting during the summer could increase the opportunity for media coverage.	Similar to Alternative 2.	Any whale hunts would receive media coverage. Similar to Alternative 2, there would be about the same number of days of hunting (20 versus 7-30). However, similar to Alternatives 3 and 6, hunting could occur during the summer, potentially increasing the opportunity for media coverage.	Similar to Alternative 6.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
TRANSPORTATION						
Highway, Marine, and Air Traffic	No change from current conditions.	Increased hunt-related traffic could increase potential for interference with highway, marine, or air traffic in the project area and could increase the risk of traffic accidents. However, hunts would be limited to the winter and early spring months and would not overlap with peak periods for highway or air traffic.	Compared to Alternative 2, more days of hunting (40 versus 7-30) would increase the potential for interference with highway, marine, or air traffic in the project area, as well as an increased risk of traffic accidents. Hunting during summer would overlap with peak periods for highway and air traffic	Similar to Alternative 2.	Similar to Alternative 2, there would be about the same number of days of hunting and a similar increase in traffic, but because hunting would occur during summer (similar to Alternatives 3 and 6), the increased traffic would overlap with peak periods for highway and air traffic.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	Alternative 1 No-action	Alternative 2 Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales	Alternative 3 Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits	Alternative 4 Sanctuary and National Wildlife Refuge Resource Alternative	Alternative 5 Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits	Alternative 6 Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits
PUBLIC SERVICES						
Law Enforcement and Medical Facilities	No change from current conditions.	Hunt-related protests could increase law enforcement needs, possibly diverting such resources from other missions. Persons suffering hunt-related injuries that exceed the capacities of local health facilities could be transported to other facilities in the region.	Compared to Alternative 2, more days of hunting (40 versus 7-30) would increase the diversion of law enforcement resources from other missions, and increase the number of injuries that require medical attention. Hunting during summer would overlap with peak periods of demand for these public services	Similar to Alternative 2.	Similar to Alternative 2, there would be about the same number of days of hunting and a similar increase in demand for law enforcement and medical services, but because hunting would occur during summer (similar to Alternatives 3 and 6), the increased demand would overlap with peak periods of demand.	Similar to Alternative 3.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
PUBLIC SAFETY						
Injury from Weapons, Boating Accidents, and Land-based Protest Activities	No change from current conditions.	Makah hunters, other participants, protesters, and bystanders would be at risk of injury from weapons, protest activities, or boating accidents during the winter and spring.	Compared to Alternative 2, more days of hunting (40 versus 7-30) could increase risks of injury from protest activity. Injury from weapons and boating accidents might decrease because year-round hunting would allow hunts to occur during more favorable weather and sea conditions.	Similar to Alternative 2.	Similar to Alternative 2, there would be about the same number of days of hunting and a similar risk of injury from protest activities, but because hunting would occur during summer (similar to Alternatives 3 and 6), there could be a decreased risk of injury from weapons and boating accidents because year-round hunting would allow hunts to occur during more favorable weather and sea conditions.	Similar to risk of injury under Alternative 3 for all groups except greater for bystanders on land in that portion of the U&A within the Strait of Juan de Fuca.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
HUMAN HEALTH						
Nutritional Benefits, Environmental Contaminants, and Exposure to Food-Borne Pathogens	No change from current conditions.	Insufficient information about nutritional value and contaminant levels in current Makah diet to allow a comparison of Alternative 2 to the No-action Alternative.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.
NATIONAL AND INTERNATIONAL REGULATORY ENVIRONMENT						
Marine Mammals Nationally	It is uncertain, but possible, that a decision not to authorize a Makah whale hunt could discourage future requests for a waiver of the MMPA.	Authorizing a Makah hunt may prompt other Indian tribes to request a similar waiver of the MMPA. The outcome of future requests would depend on the specific facts presented.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.

TABLE 2-2. SUMMARY OF EFFECTS OF THE VARIOUS ALTERNATIVES (CONTINUED)

RESOURCES	**Alternative 1** **No-action**	**Alternative 2** **Proposed Action - Hunt Outside Strait Dec. 1 - May 31, Limits on Identified Whales**	**Alternative 3** **Hunt Outside Strait, No Timing Restrictions, No Identified Whale Limits**	**Alternative 4** **Sanctuary and National Wildlife Refuge Resource Alternative**	**Alternative 5** **Hunt Outside Strait, No Timing Restrictions, More Restrictive Numbers, No Identified Whale Limits**	**Alternative 6** **Hunt Anywhere in U&A, No Timing Restrictions, No Identified Whale Limits**
NATIONAL AND INTERNATIONAL REGULATORY ENVIRONMENT (continued)						
Worldwide Whaling	U.S. decision not to authorize a Makah whale hunt is unlikely to influence the position of the United States or other countries regarding IWC issues.	It is possible, but speculative, that authorizing a Makah hunt could increase whaling worldwide by emboldening pro-whaling countries.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.	Similar to Alternative 2.
Indigenous People Worldwide	U.S. decision not to authorize a Makah whale hunt is unlikely to influence actions of other governments toward indigenous people.	Similar to No-action Alternative.	Similar to No-action Alternative.	Similar to No-action Alternative.	Similar to No-action Alternative.	Similar to No-action Alternative.

Chapter 3
Affected Environment

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3.0 AFFECTED ENVIRONMENT

This chapter describes the affected environment (environmental conditions in the project area) to provide background information for the assessment of the environmental effects of the alternatives in Chapter 4 (Environmental Consequences) and Chapter 5 (Cumulative Impacts). The affected environment sections describe the pertinent aspects of resources and the current conditions within the project area, which will be used to evaluate the anticipated environmental effects of the alternatives described in Chapter 2 (Alternatives). The first section describes geographically based management in the project area (including federal and international designated areas and tribal management of reservations and usual and accustomed grounds) to provide context for the description of the other sections. The remaining sections present the physical environment first, followed by the biological environment, then the social environment, in the project area. The specific order of the sections is as follows:

- Geographically Based Management in the Project Area (Section 3.1)
- Water Quality (Section 3.2)
- Marine Habitat and Species (Section 3.3)
- Eastern North Pacific Gray Whale (Section 3.4)
- Other Wildlife Species (Section 3.5)
- Economics (Section 3.6)
- Environmental Justice (Section 3.7)
- Social Environment (Section 3.8)
- Cultural Resources (Section 3.9)
- Ceremonial and Subsistence Resources (Section 3.10)
- Noise (Section 3.11)
- Aesthetics (Section 3.12)
- Transportation (Section 3.13)
- Public Services (Section 3.14)
- Public Safety (Section 3.15)
- Human Health (Section 3.16)
- National and International Regulatory Environment (Section 3.17)

The resources considered for environmental review in Chapters 3 to 5 of this environmental impact statement (EIS) are those that the National Marine Fisheries Service (NMFS) has identified as having the potential to be affected by the project alternatives. To determine the correct resources to analyze, NMFS first compiled a complete list of physical, biological, and social resources during internal agency project scoping. NMFS then reduced the list to those that might have any potential to be affected by the project and published notices of intent in the Federal Register requesting public comments on various components of the EIS, including resources to be analyzed. After considering public comments, some resources were identified as not having the potential to be affected by the action alternatives, and are, therefore, not analyzed in this EIS. These resources include utilities, air quality, geology and soils, groundwater, hazardous waste, energy, housing, light and glare, and National Historic Preservation Act cultural properties.

3.1 Geographically Based Management in the Project Area

The project area is confined primarily to the marine waters, islands, and land areas near the Makah Tribe's usual and accustomed fishing grounds (U&A) in the Pacific Ocean and Strait of Juan de Fuca that may be directly or indirectly affected by the proposed whale hunt (Figure 1-1) (Section 1.1.2, Project Location). The project area encompasses several federally designated and managed areas, including the Olympic Coast National Marine Sanctuary (OCNMS or Sanctuary), the Washington Islands National Wildlife Refuges, the United States Coast Guard (Coast Guard) regulated navigation area (RNA), Olympic National Park, and internationally designated areas, including a United Nations World Heritage Site and the Olympic Biosphere Reserve. The project area also includes the Makah and Ozette Reservations. These designated and managed areas have objectives and policies that are directly or indirectly related to the proposed action as described below.

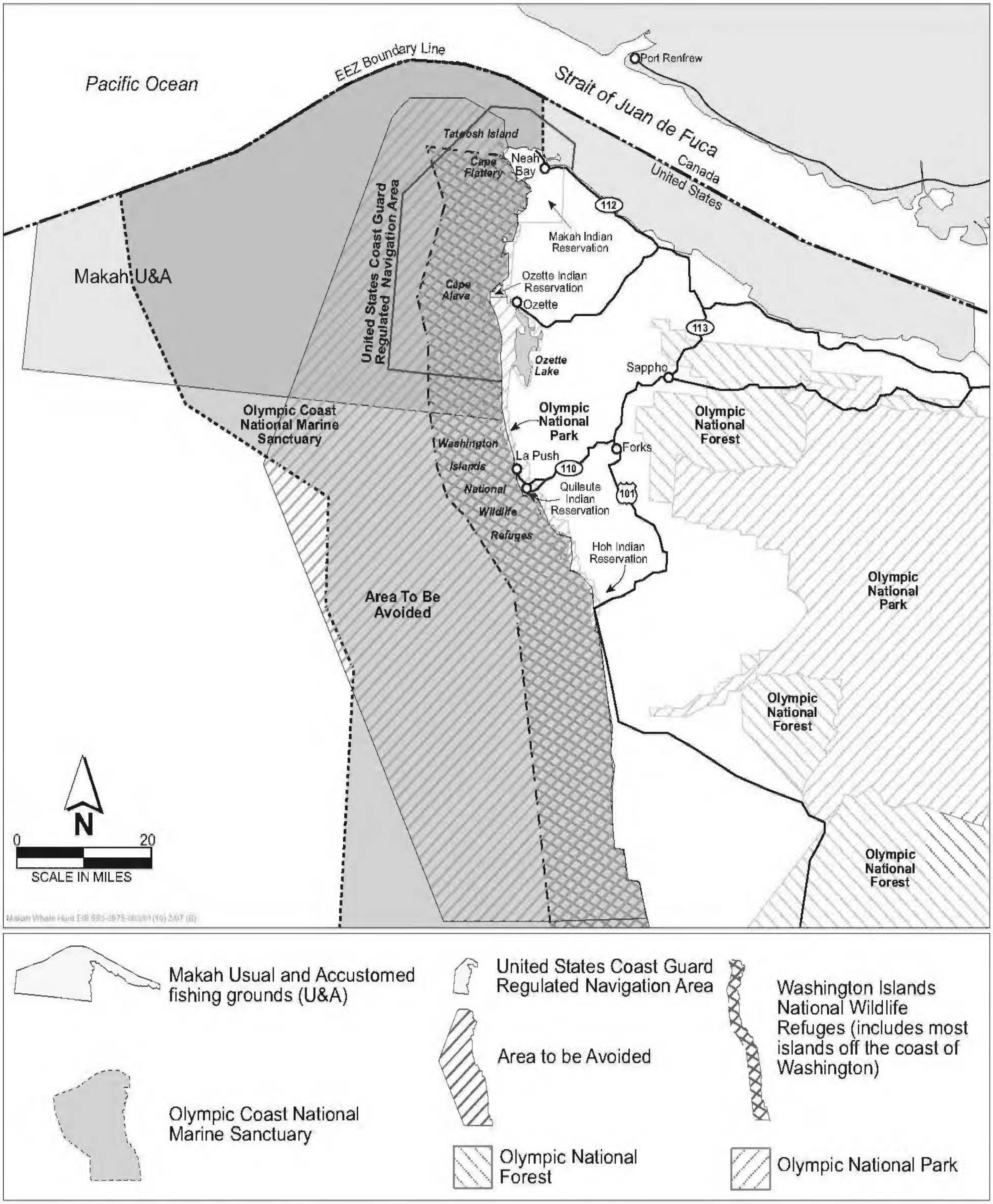

Figure 3-1. Designated and Managed Areas

3.1.1 Designated Areas

3.1.1.1 Olympic Coast National Marine Sanctuary

3.1.1.1.1 <u>Introduction</u>

The OCNMS is one of 13 national marine sanctuaries in United States waters, located off the northwest coast of Washington State and encompassing a 2,500-square-nautical-mile area of coastal and ocean waters and submerged lands along the Olympic Peninsula and the western portion of the Strait of Juan de Fuca. Figure 3-1 identifies the portion of the OCNMS in the project area.

3.1.1.1.2 <u>Designation and Regulatory Overview</u>

The Secretary of Commerce designated the OCNMS in 1994 as an area of special national significance under the authority of the National Marine Sanctuaries Act (16 United States Code [USC] 1431 et seq.) due to its unique and nationally significant collection of flora and fauna, and adjacency to the Olympic National Park. In the OCNMS Designation Document (published in 59 FR 24586, May 11, 1994) and 1993 Final EIS and Management Plan (National Oceanic and Atmospheric Administration [NOAA] 1993), NOAA noted that the Sanctuary is a highly productive, nearly pristine ocean and coastal environment that is important to the continued survival of several ecologically and commercially important species of fish, seabirds, and marine mammals. In the Designation Document and the Final EIS and Management Plan, NOAA enumerated biological and historical resources that give the Sanctuary particular value (NOAA 1993). Some of the biological resources NOAA identified that give the Sanctuary particular value include high biological productivity, diversity of habitats, a wide variety of marine mammals and birds living in or migrating through the area, and the presence of endangered and threatened species and essential habitats.

In particular, NOAA noted that the unusually large and diverse range of habitats comprising the Sanctuary includes the following:

- Offshore islands and rocks (most are within the Flattery Rocks, Quillayute Needles, and Copalis National Wildlife Refuges)
- Large and diverse kelp beds
- Intertidal pools
- Erosional features (such as rocky headlands, seastacks, and arches)
- Interspersed exposed beaches and protected bays
- Submarine canyons and ridges

- The continental shelf (including a broad shallow plateau extending from the mouth of the Juan de Fuca canyon)
- Continental slope environments

The numerous sea stacks and rocky outcrops along the Sanctuary shoreline, coupled with a large tidal range and wave splash zone, support some of the most diverse and complex intertidal zones in the United States (59 FR 24586, May 11, 1994). NOAA also identified several historical resources that give the Sanctuary particular value, including Indian village sites, ancient canoe runs, petroglyphs, Indian artifacts, and numerous shipwrecks (NOAA 1993; 59 FR 24586, 24604, [May 11, 1994]). Extensive archeological work oriented toward late prehistoric culture had been completed along the Washington coastline at the time of designation, including a major archeological dig conducted at Ozette, near Cape Alava, which uncovered an ancient village thought to be 2,000 years old and considered to be one of the most significant excavations in North America (NOAA 1993). NOAA also found that an important feature of the Sanctuary is its proximity to four Native American reservations and the U&As of the Makah and Ozette, Quileute, Hoh, and Quinault Indian Tribes. Tribal members use the Sanctuary area for subsistence and commercial harvesting and for religious ceremonies; the presence of Indian tribes along the coast adds special cultural character and historical significance to the Sanctuary (NOAA 1993).

NOAA's National Ocean Service, Sanctuaries and Reserves Division, National Marine Sanctuaries Program, administers the OCNMS, managed on location by Sanctuary staff in Port Angeles. The mission statement of the OCNMS program is to protect the Olympic Coast's natural and cultural resources through responsible stewardship, to conduct and apply research to preserve the area's ecological integrity and maritime heritage, and to promote understanding through public outreach and education. These multiple-use management objectives are achieved through both cooperative management and regulation. NOAA finds that one of the major benefits of establishing the OCNMS is the integration of important nearshore and oceanic marine resource zones and corresponding human activities, including federal, state, and tribal management of those activities, under one coordinated management regime (NOAA 1993). To this end, Sanctuary staff coordinates management with the Washington State Departments of Ecology (Ecology), Natural Resources, Fish and Wildlife, and Agriculture; the United States and Canadian Coast Guards; the United States Fish and Wildlife Service (FWS); the National Park Service; the four coastal tribes (Makah, Quileute, Hoh, and Quinault Indian Tribes); local businesses, towns, counties, timber and fishing representatives; and research and education institutions. To better understand certain stakeholder interests, the Sanctuary staff listens to a Sanctuary Advisory

Council, comprising representatives of Indian tribes, state and local governments, other federal agencies, industry, conservation organizations, and citizens. The Sanctuary Advisory Council operates under a charter and serves strictly in a voluntary, advice-giving role. The Sanctuary program staff also reviews ocean management in the OCNMS with the four coastal tribes, including the Makah Tribe, the Northwest Indian Fisheries Commission, and the state of Washington, through the Intergovernmental Policy Council (NOAA 2007). The Intergovernmental Policy Council was created by a memorandum of agreement in 2006 (NOAA 2007).

Regulations governing the OCNMS are located at 15 Code of Federal Regulations (CFR) Part 922, Subpart O. The regulations describe Sanctuary boundaries, prohibit certain kinds of activities, and set up a permitting system to allow some activities that are otherwise prohibited. Activities generally prohibited in the OCNMS include offshore oil, gas, and mineral exploration, development, or production; pollution discharge; seabed disturbance; and possessing, moving, removing, or injuring any historical resource. Prohibited activities that are particularly relevant to the proposed action include flight level restrictions and marine mammal take restrictions. Flying motorized aircraft at less than 2,000 feet both above the Sanctuary and within 1 nautical mile of the shoreline or National Wildlife Refuge islands is prohibited under 15 CFR 922.152(6), unless the Sanctuary staff issues a permit (with certain exceptions, e.g., valid law enforcement and national defense activities). This prohibition is consistent with the 2,000-foot flight advisory over the adjacent Olympic National Park and National Wildlife Refuges and is designed to limit the potential effects of noise, particularly as it might affect hauled-out seals and sea lions, sea otters, and nesting birds along the shoreline and offshore rocks and islands of the Sanctuary (NOAA 1993; 59 FR 24586, 24608 [May 11, 1994]).

Regulations also prohibit taking any marine mammal, sea turtle, or seabird in or above the Sanctuary, except as authorized by the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Migratory Bird Treaty Act, or pursuant to any treaty with an Indian tribe to which the United States is a party (15 CFR 922.152(5)). If the taking is conducted pursuant to an Indian treaty, the taking is to be exercised in accordance with the MMPA, ESA, and the Migratory Bird Treaty Act, to the extent that they apply (15 CFR 922.150(5)). For applicability of these federal laws to the Makah Tribe's treaty right of taking fish and of whaling or sealing at usual and accustomed grounds and stations, refer to Chapter 1, Purpose and Need, and Chapter 2, Alternatives, of this EIS.

3.1.1.1.3 Current Issues

OCNMS Management Plan Review. The 1994 OCNMS Management Plan outlines objectives for resource protection, research, and education programs. Section 304(e) of the National Marine Sanctuaries Act requires five-year periodic reviews of management plans; a review of the OCNMS Management Plan will begin in 2007. These reviews include the effectiveness of site-specific management techniques and strategies implemented at the Sanctuary, along with a review of management objective priorities.

Area to be Avoided. In 1995, Sanctuary staff worked with the Coast Guard and the International Maritime Organization to establish an area to be avoided for the primary purpose of preventing a catastrophic oil spill. The area to be avoided is a voluntary ship traffic management program that advises operators of ships greater than 1,600 gross tons, which carry large amounts of bunker fuel and hazardous materials, to maintain a 25-mile buffer from the coastline in its southern portion, narrowing to approximately 8 nautical miles west of Cape Flattery and 1 nautical mile (1.2 miles) north of Neah Bay. This area to be avoided corresponds largely with the nearshore portion of the Makah Tribe's U&A (Figure 3-1). The restrictions do not apply to vessels that are engaged in an otherwise permitted activity that occurs predominantly within the Sanctuary, such as fishing or research. Of 6,938 vessel transits through the Sanctuary in 2004, all but 260 remained outside of the area to be avoided, equating to an estimated compliance rate of 96 percent (Ecology 2005a). More information on vessel traffic can be found in Section 3.13.3.2, Marine Vessel Traffic. See also Section 3.2.3.3, Spill Prevention.

Sanctuary Research. The Sanctuary staff conducts and sponsors ongoing research as a component of its management program. The Sanctuary's current research program includes studies on water quality, groundfish, seafloor mapping, intertidal ecology, marine mammals, and seabirds (NOAA 2001a; NOAA 2006). The marine mammal research at the Sanctuary includes sea otter *(Enhyrda lutris)* population and distribution, radio telemetry, and food habit studies; pinniped aerial surveys for population and distribution information; gray whale *(Eschrichtius robustus)*, killer whale *(Orcinus orca)*, and humpback whale *(Megaptera novaeangliae)* photo-identification; and surveys on the offshore distribution of cetaceans and pinnipeds (NOAA 2001b). The water quality studies have focused on harmful algal blooms and why these blooms may occur on the Washington coast. The seafloor mapping studies have included surveys of deep-water coral and sponge assemblages, as well as the effects of bottom-trawling activities for fish harvesting on these benthic communities.

Tribal Journeys. During summer 2005, the Sanctuary provided logistical and documentary support for Tribal Journeys, a multi-tribe celebration of Northwest Coast Native American and First Nation canoe culture. Tribes from Vancouver Island, mainland British Columbia, and the Puget Sound region traveled by canoe to the village of Taholah, where they were hosted by the Quinault Indian Nation. Canoe crews, their families, and supporters camped at villages of the Makah, Quileute, and Hoh Tribes. The Sanctuary outfitted a research vessel to provide safety and support for the participants and documented the journey on video (NOAA 2003).

Sanctuary Cooperation with the Makah Tribe. The Makah Tribe is a key partner in Sanctuary public relations, education, and outreach. The Makah Cultural and Research Center has fostered a strong relationship with the Sanctuary through development and implementation of a cooperative interpretive program centered on the Makah Reservation. Since 2000, the Sanctuary has provided annual funding to the Makah Cultural and Research Center to hire Makah interpreters and guides for a 17-week summer program (Bowechop 2006). Makah interpreters hosted more than 15,000 Sanctuary visitors who learned about coastal issues, Makah culture, and natural history within the area. Sanctuary staff also supported the creation of the Makah Office of Marine Safety to provide technical assistance in developing and planning pollution prevention strategies and to represent the Tribe's interest in guarding treaty-protected resources from oil spills (NOAA 2006). For more information on spill prevention, see Section 3.2.3.3, Spill Prevention. Since 2006, the Makah Tribe has also been member of the Sanctuary's Intergovernmental Policy Council.

3.1.1.2 Washington Islands National Wildlife Refuges

More than 870 islands, rocks, and reefs extending for more than 100 miles along the coast of Washington State are included in three national wildlife refuges: Quillayute Needles, Flattery Rocks, and Copalis (collectively called the Washington Islands National Wildlife Refuges). The islands range from less than 1 acre to about 36 acres, and most drop abruptly into the sea. The islands are protected from human disturbance and predators and are close to abundant ocean food sources. The islands provide refuge for more than 20 species of birds as they nest and raise their young; the total population of seabirds, waterfowl, and shorebirds may exceed one million birds (Section 3.5.3.2, Existing Conditions, Other Marine Wildlife, for more information on birds nesting on islands off the coast of Washington). In addition, sea lions, harbor seals, sea otters, porpoises, and whales are commonly found around the islands (Section 3.5.3.1, Existing Conditions, Marine Mammals, for more information on marine mammals that occur near these islands). All three refuges were originally established as migratory bird sanctuaries through Executive Orders 703, 704, and 705 issued by President Theodore Roosevelt in 1907, and later redesignated as refuges in 1940 (Presidential Proclamation, July 30, 1940) and wilderness areas in 1970 (under the Wilderness Act of 1964, 16 USC 1131 et seq.), except for Destruction Island, which was excluded due to the presence of an operational Coast Guard lighthouse on the island. The Flattery Rocks and Quillayute Needles National Wildlife Refuges are within the Makah Tribe's U&A and the OCNMS. The Flattery Rocks and Quillayute Needles National Wildlife Refuges encompass 125 acres and are located along the northwestern portion of Washington State, beginning about 1 mile south of Tatoosh Island and extending approximately 3 miles south of Destruction Island.

The refuges are maintained as a sanctuary for nesting seabirds and marine mammals and are managed by the FWS. The FWS coordinates with NOAA's Olympic Coast National Marine Sanctuary staff to prohibit motorized aircraft less than 2,000 feet above certain portions of the refuges. The FWS also manages the refuges cooperatively with the National Park Service through a memorandum of understanding, because the refuges are within the exterior boundaries of Olympic National Park (National Park Service and FWS 1993). The objective of the Washington Islands National Wildlife Refuges is to enhance protection and interpretation of the wildlife, natural, and scenic resources of the refuges by taking the following measures:

- Minimizing human impacts
- Maintaining the wilderness character of the area
- Helping the public understand and appreciate the value of the refuges
- Conducting research to understand the refuge resources

The FWS has also issued advisories prohibiting public access to the islands and is recommending a voluntary 200-yard exclusion area around each island to avoid the flushing of nesting seabirds by boat and other vessel traffic (FWS 2007).

The FWS prepared a Washington Islands National Wildlife Refuges Comprehensive Conservation Plan/Environmental Assessment (EA) (FWS 2007) to guide its management of the Flattery Rocks National Wildlife Refuges, as well as the Quillayute Needles and Copalis National Wildlife Refuges. Management activities include monitoring the refuge wildlife and protecting and maintaining the natural functioning ecosystem. The plan directs the FWS to coordinate with other agencies and tribes to ensure continuation of the long-term health and viability of native seabird and marine wildlife populations. The Washington Islands National Wildlife Refuges Comprehensive Conservation Plan/EA includes the Treaty of Neah Bay as a law or executive order potentially applicable to its Comprehensive Conservation Plan/EA (FWS 2007) (specifically the Tribe's fishing, whaling, and sealing rights within its U&A, as well as hunting and gathering rights on open and unclaimed lands). The Washington Islands National Refuge System adheres to laws, regulations, and policies applicable to all National Refuge Systems (50 CFR Subchapter C, Parts 25 to 32). Goals, objectives, and strategies applicable to the Washington Islands National Wildlife Refuge Comprehensive Conservation Plan/EA are listed below:

- Protect migratory birds and other native wildlife and their associated habitats, with special emphasis on seabirds.
- Protect and support the recovery of federally threatened and endangered species and Washington State special status species and their associated habitats.
- Promote and manage the Washington Islands Wilderness Area to maintain its wilderness character and values.
- Promote effective coordination and cooperation with others for conservation of refuge resources with special emphasis on government agencies and tribes with adjoining ownership and/or jurisdiction.
- Continue to enhance long-term monitoring and sustained applied research.
- Increase public interpretation and awareness programs to enhance appreciation, understanding, and enjoyment of refuge resources.

3.1.1.3 Coast Guard Regulated Navigation Area

The United States Coast Guard has established an RNA (Figure 3-1) in the Strait of Juan de Fuca and adjacent coastal waters of northwest Washington (33 CFR 165.1310) under its Ports and Waterways Safety Act authority (33 USC 1221 et seq.), allowing the Coast Guard to enforce vessel activities near any Makah whale hunt and reduce the danger of loss of life and property from any hunt. When finalizing the RNA after the 1999 hunt, the Coast Guard specifically found that "the uncertain reactions of a pursued or wounded whale and the inherent dangers in firing a [.50 caliber] hunting rifle from a pitching and rolling small boat are likely to be present in all future hunts, and present a significant danger to life and property if persons or vessels are not excluded from the immediate vicinity of a hunt" (64 FR 61212, November 10, 1999).

The RNA rests entirely within the Makah U&A (Figure 3-1); its boundaries enclose waters off Neah Bay and the Strait of Juan de Fuca in the north, wrap around Cape Flattery and Tatoosh Island, and then parallel the shore at a 10-nautical-mile (11.5-mile) distance until the southern boundary is formed by connecting to the shore at the southern extent of the U&A. The Coast Guard extended the southern boundary of the RNA to match the southern boundary of the U&A when the final rule was promulgated in 1999 (64 FR 61212, November 10, 1999). When the interim rule (63 FR 52609, October. 1, 1998) was in force during the 1999 Makah whale hunt, most of the Makah whale hunting and associated protesting activities occurred farther south than the borders of the RNA (though the whale hunting activities and the protesting incidents still occurred within the Makah U&A) (Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007, for more information about these whale hunting and protest activities).

Within the RNA during any Makah whale hunt, a moving exclusionary zone (MEZ), for "the column of water from the surface to the seabed within a radius of 500 yards centered on the Makah whale hunt vessel" is activated when one Makah whale hunt vessel (i.e., the canoe or the chase boat with the rifleman) displays an international numeral pennant 5 between sunset and sunset when surface visibility exceeds 1 nautical mile (33 CFR 165.1310(b)). No person or vessel may enter the MEZ when it is activated, except for the authorized Makah whale hunt vessel, an authorized media pool vessel preauthorized by the Coast Guard, or another vessel or person authorized by the Coast Guard (33 CFR 165.1310(c)), such as the observer vessel. The authorized media pool vessel must maneuver to avoid positioning itself between whales and hunt vessels, out of the line of fire, at a prudent distance and location relative to the whale hunt operations, and in a manner that avoids hindering the hunt or path of the whale in any way (33 CFR 165.1310(f)(3)). The media pool vessel operates at its own risk, but must adhere to safety and law enforcement instructions from Coast Guard personnel (33 CFR 1310(f)). The regulation does not affect normal transit or navigation in the RNA. Refer to Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007, Section 3.15.2.1, Vessel Safety Regulations and Authorities, and Section 3.15.3.4 Behavior of People Associated with the Hunt, for more information about the operation of the RNA and the MEZ during Makah whale hunting from 1998 to 2000.

3.1.1.4 Olympic National Park

The Olympic National Park comprises 922,651 acres located primarily in the center of the Olympic Peninsula and includes lands along the upper northern coast of Washington State (Figure 3-1). President Theodore Roosevelt originally created the Olympic National Monument in 1909; Congress later redesignated and authorized the monument as a National Park in 1938 (Chapter 812, 52 Stat. 1241). In 1988, Congress designated about 95 percent of the park (876,669 acres) as wilderness through the Washington Park Wilderness Act (16 USC 90 note, Public Law 100-668); it is now one of the largest wilderness areas in the contiguous United States. Combined with the OCNMS, the two designations protect almost 5,000 square miles of intertidal, island, and ocean habitats. The National Park Service is the federal agency that manages the park to preserve and protect, unimpaired, the park's diverse natural and cultural resources and provide for the enjoyment, education, and inspiration of present and future generations. More than 650 archeological sites documenting 10,000 years of human occupation are protected within the Olympic National Park lands (National Park Service 2008). Ten Peninsula tribes retain their ongoing connection between community and traditional lands, including the Makah Tribe, Hoh Tribe, Jamestown S'Klallam Tribe, Quileute Tribe, Quinault Nation, Skokomish Tribe, Squaxin Tribe, Suquamish Tribe, Elwha Klallam Tribe, and Port Gamble S'Klallam Tribe. The park also protects cultural resources that reveal and document the 200-year history of discovery, exploration, homesteading, and community development in the region (National Park Service 2008).

The National Park Service recently prepared a general management plan/EIS for the park that describes a vision for its future (National Park Service 2008). The plan is intended to guide park decision-making for the next 15 to 20 years. Management emphasis for the National Park Service's preferred alternative is protecting resources and improving visitor experiences. This goal would be accomplished by accommodating diverse visitor use, providing sustainable access on existing roads, improving mass transit opportunities, and concentrating improved educational and recreational opportunities on the developed park edges. The National Park Service plans to provide more park information to visitors so that they can better plan their visits. Under the preferred alternative, visitation and wilderness use would be managed for resource protection and to improve visitor experiences. Comprehensive maintenance, protection, and preservation measures, in accordance with the Secretary of the Interior's Standards, would be used for those structures listed or eligible for listing on the National Register of Historic Places.

3.1.1.5 World Heritage Site

The Olympic National Park was designated as a United Nations Educational, Scientific, and Cultural Organization World Heritage Site in 1981, and it is one of 20 World Heritage Sites in the United States (UNESCO 1981). The Word Heritage Site list was established under the terms of the Convention Concerning the Protection of World Culture and Natural Heritage that was adopted in 1972 at the 17th General Conference of the United Nations Educational, Scientific, and Cultural Organization. World Heritage Site objectives are to encourage the identification, protection, and preservation of cultural and natural heritage sites that are considered to be of outstanding value to humanity. These sites are listed to be protected for future generations to appreciate and enjoy. The Convention states that a World Heritage Committee will establish, keep up to date, and publish a World Heritage List of cultural and natural properties submitted by the states and considered to be of outstanding value UNESCO.

3.1.1.6 Olympic Biosphere Reserve

The Olympic Peninsula, including the Olympic National Park, was designated as a biosphere reserve in 1976 (UNESCO 1976). Biosphere reserves are areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with sustainable use. The reserves are internationally recognized, nominated by national governments, and remain under sovereign jurisdiction of the states where located. Each biosphere reserve is intended to fulfill three basic functions:

- Conservation function that contributes to the conservation of landscapes, ecosystems, species and genetic variation
- Development function that fosters economical and human development that is socio-culturally and ecologically sustainable
- Logistic function that provides support for research, monitoring, education, and information exchange related to local, national, and global issues of conservation and environment

The objective of this designation is to set aside areas with representative ecosystems to achieve the fullest possible biogeographical cover over the world and ensure systematic conservation of biodiversity.

The Olympic Biosphere Reserve is one of 51 designated biosphere reserves in the United States. This reserve is considered one of the best examples of intact and protected temperate rainforests in the Pacific Northwest. Other outstanding characteristics include rivers supporting some of the best habitat for anadromous fish species, the longest undeveloped wilderness coast in the United States, and rich native and endemic animal and plant species (UNESCO 1981).

3.1.1.7 Other Designated Areas

NMFS and the Pacific Fishery Management Council have identified essential fish habitat within the project area under Magnuson-Stevens Act authority. More information about the establishment and identification of essential fish habitat and habitat areas of particular concern is presented in Section 3.3, Marine Habitat and Species. NMFS has also identified critical habitat for certain threatened and endangered species under its ESA authority occurring within the project area. More information on critical habitat of fish species occurring within the project area is in Section 3.3, Marine Habitat and Species. More information on critical habitat for other marine wildlife, including recently designated critical habitat for southern resident killer whales

(71 FR 69057, Nov. 29, 2006), is in Section 3.5.3.1.1, ESA-Listed Marine Mammal Species, and Section 3.5.3.2.1, ESA-Listed Species (Other Marine Wildlife).

3.1.2 Makah Management of Reservation and U&A Areas

The Makah Reservation is located on the northwesternmost tip of the Olympic Peninsula (Figure 3-1) and encompasses 44 square miles of land (30,142 acres) bounded by the Pacific Ocean to the west and the Strait of Juan de Fuca to the north. The approximately 1-square-mile Ozette Reservation, 10 miles south of Neah Bay, is also part of the Makah Reservation, with the Olympic National Park managing the contiguous shoreline between the two areas of the reservation.

The relationship between the United States and Makah Tribe was formalized upon ratification of the Treaty of Neah Bay in 1855. Following the 1975 Indian Self-Determination and Education Assistance Act (Public Law [PL] 93-638), the Tribe entered into self-determination contracts with the Bureau of Indian Affairs (BIA). Later, the Tribe entered into tribal self-governance compacts in accordance with the Tribal Self-Governance Act of 1994 (PL 103-413). The tribal self-governance compact incorporates virtually all BIA programs on the reservation. The Tribe has also entered into a self-governance compact with the Department of Health and Human Services (under the Tribal Self-Governance Amendments of 2000, PL 106-260), addressing the delivery of health services to tribal members. In addition, following a series of court decisions establishing the right of the Makah and other Washington state treaty tribes to half the harvestable surplus of salmon (*United States v Washington* 1974 [‘Boldt decision’]) and shellfish (*United States v Washington* 1994 [‘Rafeedie decision’]), the federal government formally recognized that the four Washington coastal tribes (Makah, Quileute, Quinault, and Hoh) have treaty rights to groundfish in their respective U&As (Pacific Fishery Management Council and NMFS 2006). In accord with these decisions and recognition, the Makah Tribe participates in a variety of fisheries management forums such as the North of Falcon process, the Pacific Fisheries Management Council, and the Pacific Salmon Treaty.

The Makah Tribe is governed by an elected tribal council. The Constitution and Bylaws of the Makah Indian Tribe, adopted in 1936, describe the organization and authority of the Makah Tribal Council. The council consists of five members elected for staggered three-year terms. The Makah Tribal Council selects officers from its membership, including, but not limited to chairman, vice-chairman, and treasurer. Currently the secretary is appointed from outside the Makah Tribal Council. The secretary is a tribal employee fulfilling the requirements of the office on behalf of the Makah Tribal Council. Any tribal member who is 21 years of age or older and has lived on the reservation for one year immediately preceding an election is eligible to vote, and any legal voter is eligible to be elected to serve on the Council.

As stated in the Constitution and Bylaws of the Makah Indian Tribe, the powers of the Tribal Council include the power to perform the following actions:

> To promulgate and enforce ordinances, which shall be subject to review by the Secretary of the Interior, governing the conduct of members of the Makah Indian Tribe, and providing for the maintenance of law and order, and the administration of justice by establishing a reservation Indian court and defining its duties, powers, and limitations . . . . To safeguard and promote the peace, safety, morals and general welfare of the Makah Indian Tribe by regulating the conduct of trade and the use and disposition of property upon the reservation . . . . To adopt resolutions regulating the procedure of the council itself and other tribal agencies and tribal officials of the reservation (Article IV, Sections 1(i), (j), and (n)).

The constitution and bylaws may be amended by a majority vote of the qualified tribal voters. A referendum on any proposed or enacted ordinance or resolution of the Tribal Council may be called if at least one-third of the qualified tribal voters petition for one. The majority vote of such a referendum is conclusive and binding on the Makah Tribal Council.

Laws and regulations are enforced under the provisions of the Makah Law and Order Code. The Makah Law and Order Code establishes a tribal court, defines its jurisdiction, provides for tribal police, details the selection and procedures for judges and juries, and includes a criminal code and procedures for criminal and civil actions. If NMFS authorized a gray whale hunt, the Tribe proposes to adopt laws and regulations to enforce NMFS' regulations governing the hunt.

3.1.2.1 Makah Tribal Departments and Agencies

The Makah Tribal Council oversees the operations and management of some 14 governmental departments and six tribally chartered organizations. The Council identifies priorities and aids Departments in planning through a strategic planning process. A five-year strategic plan was developed in 2005, and both the Council and Departments revisit goals and objectives annually (Makah Tribe 2005b). The 2006 annual update of the five-year strategic plan is referred to as the 2006 Update to the 2005 Comprehensive Economic Development Strategy (Makah Tribe 2006b). The five-year plan (Makah Tribe 2005b; Makah Tribe 2006b) describes the Makah Departments:

Makah Social Services comprises six programs: Domestic Violence Program, Low Income Home Energy Assistance Program, General and Employment Assistance Program, Family

Services Program, Senior Citizens Program, and United States Department of Agriculture Food Distribution Program.

Makah Education provides services to tribal/community members for higher education and the Workforce Investment Act program, i.e., funding, work placements, and clothing vouchers.

Makah Realty protects and promotes the trust assets (realty and physical property) of the Makah Tribe and the tribal membership.

Makah Operations addresses essential and basic health, legal, transportation, community beautification, and employment and training needs of tribal community.

Makah Justice Team provides a forum for resolving disputes that is consistent with applicable governing laws and in keeping with the traditional and cultural values of the Makah Tribe. This includes the tribal court system.

Makah Health Services (Sophie Trettevick Health Center) provides primary medical care and dental services. There are three permanent providers at the clinic, two medical doctors and one nurse practitioner. The clinic is open Monday through Friday, from 8:00 a.m. to 5:00 p.m., with emergency service available via 911, 24 hours a day, 7 days a week. Emergency medical situations are addressed by providing stabilization and transport to the nearest appropriate facility. Airlift Northwest (Seattle) can be called in, based on emergency medical technician and/or provider determination. If Airlift Northwest is not available, the Coast Guard may provide transport. The Coast Guard responds to open-water-related emergencies. Although the health clinic provides day-to-day care service to tribal members, it will treat anyone with life- or limb-threatening injuries. Such injured non-Indians are treated to stabilize their injuries and transport them to an appropriate facility. The facility has a memorandum of agreement with Clallam Bay Fire District 5 to provide mutual assistance in emergency situations.

Makah Forestry establishes and develops policies to guide management of the forested lands of the Makah Indian Reservation and serve as a basis for decision-making by Makah Natural Resources Departments and the Makah Tribal Council.

Makah Environmental Division includes Treaty Reserved Rights Protection, Environmental Planning, Environmental Health, Air Quality, Water Quality/Resources, and Environmental Education.

Makah Public Safety is responsible for tribal law and ordinance enforcement, emergency medical care, and fire department services. Makah Public Safety includes the Police

Department, Corrections, Communications, Adult Probation, Natural Resources Enforcement, Emergency Medical Services (providing emergency medical care 24 hours per day to residents [tribal and non-tribal individuals] and visitors to the reservation), Volunteer Fire Department, and Animal Control. There are eight uniformed police officers. In addition, four natural resources enforcement officers are responsible for enforcing hunting, fishing, and forest products permits/regulations. They are trained law enforcement officers who can supplement the Police Department officers, as needed. The Fire Department consists of two full-time employees and 10 volunteers, with two engines and one aid car. Emergency response is provided by two full-time staff and eight volunteers, with two ambulances (a third ambulance will be obtained in 2007).

Makah Planning (Community Planning and Economic Development) provides integrated, comprehensive, and traditional planning support to the Makah Tribal Council in decision-making concerning economic and community development.

Makah Fisheries Management is responsible for protecting, sustaining, and enhancing the relationship between the Makah Tribe and the many aquatic species that play a vital part in both the Tribe's cultural and economic well being. The Department manages more than 20 different fisheries within the Tribe's U&A. The fisheries target a wide variety of fish species, use diverse gear types, and span seasonal time periods throughout the entire year.

Makah Whaling Commission is housed in the Fisheries Department, although it is directly responsible to the Makah Tribal Council. The Council first adopted the Charter of the Makah Whaling Commission in 1996 with Resolution 10-97, and amended it in 2001 with Resolution 100-01. The Makah Whaling Commission conducts educational programs, in particular to train whaling crews in compliance with the tribal whaling regulations and Whaling Convention Act (WCA) regulations. The Makah Whaling Commission also initiates and conducts research on methods to improve whaling methods. The Makah Whaling Commission is organized around the traditional heads of Makah families, for the purpose of advising and making recommendations to the Makah Tribal Council regarding "rules and regulations to govern the conduct of treaty ceremonial and subsistence whaling," and "the administration and enforcement of such regulations, and [the] conduct[ing of] educational programs and research relating to ceremonial and subsistence whaling" (Makah Whaling Commission Charter 2001). The Makah Tribal Council considers the Whaling Commission's recommendations regarding tribal regulations and tribal permits authorizing the conduct of treaty ceremonial and subsistence whaling.

The Whaling Commission confirms that the whaling captain and crew have met the training guidelines and other applicable requirements for a permit. Upon concurrence of the Makah Whaling Commission, the executive director (or manager) and president sign the permit and present it to the Makah Tribal Council for approval. A whaling permit is valid upon an affirmative vote of the Makah Tribal Council and is finally approved by the tribal chair. The tribal whaling permit is issued to the whaling captain. It identifies the whaling captain, date issued, vessels involved, names of crew members, and area where the hunt is authorized. The permit also identifies conditions that will result in its termination: landing of a gray whale, striking and losing a gray whale, and expiration of the permit after 10 days (without a strike or landing) or due to voluntary termination by the Makah Whaling Commission or Makah Tribal Council.

Administrative Services Department provides administrative financial services to the Tribe, including complying with applicable federal, state, and local policies; ensuring effective financial, personnel, procurement, and property management; promoting the highest standards of integrity, impartiality, and professionalism (in conduct of administrative programs); and promoting effective coordination and improved management practices among tribal programs, the Makah Tribal Council, enterprises, and outside agencies.

Tribal Enterprises. There are several separately chartered enterprises: Makah Business Enterprises, Makah Forestry Enterprise, Makah Cultural and Research Center, Makah Housing Authority, and Port of Neah Bay/Makah Marina. Makah Business Enterprises “operates within the structure of the Tribe.” The other entities operate under independent boards (appointed by Makah Tribal Council).

- **Makah Business Enterprises** is responsible for creating and enhancing a for-profit sector for the betterment of the Makah tribal community. The businesses operating under Makah Business Enterprises are intended to generate profits, develop self-sufficiency, and create employment. Five businesses operate under Makah Business Enterprises: Makah Mini-Mart/Fuel Station, Hobuck Beach RV and Cabin Resort, Makah Earth Resources Company, Warmhouse Restaurant, and Bingo.
- **Makah Forestry Enterprise** focuses on sustainable timber harvests while marketing logs and other forest-related products.
- **Makah Cultural and Research Center** is a nonprofit organization dedicated to revitalizing and preserving Makah culture. Its operations include an archive and research library, a museum, an education department, a language program, and a Tribal Historical

Preservation Department that manages cultural properties on the Reservation. Makah Cultural and Research Center receives approximately 14,000 visitors and researchers annually.

- **Makah Housing Authority** builds, rehabilitates, and weatherizes homes; acquires land for neighborhood revitalization development; and develops local capacity to provide these services.
- **Port of Neah Bay/Makah Marina** was chartered in 1996 and assumed management of the Makah Marina and Big Salmon Fishing Resort. The Marina provides year-round moorage for tribal and non-tribal fishing fleets. The Port's mission is to develop, construct, regulate, and operate facilities and infrastructure for the transportation and industrial needs of the Makah Reservation to create profitable opportunities for tribal and individual businesses through project revenues, bonds, grants, and other sources. The Port also provides administration and regulation over reservation waters and leads negotiations for recreational fishing quotas and seasons. The Port manages contracts with the Marine Spill Response Corporation and National Response Corporation and keeps a list of responders for spill responses and protection around the Olympic Peninsula (Makah Tribe 2006b).

3.1.2.2 Makah Tribal Programs and Management Plans

Through the Makah Tribal Council and tribal departments, the Makah Tribe operates numerous governmental programs under a variety of management plans. Those most relevant to this EIS are described below.

3.1.2.2.1 Makah Public Safety Program

In addition to weapons training, police officer training includes advanced narcotics training, forensics, and critical incident management. In 2005, the Makah Tribal Council adopted the National Management Incident System for response to emergencies that may affect the tribal community. Most emergency situations are handled locally, but major incidents may require assistance from state or federal authorities. The National Management Incident System was developed to better coordinate responders from different jurisdictions and disciplines in the event of natural disasters and emergencies, including acts of terrorism. Benefits include a unified approach to incident management; standard command and management structures; and emphasis on preparedness, mutual aid, and resource management. The website is http://www.fema.gov/emergency/nims/index.shtm.

Using the National Management Incident System template, the Makah Tribal Council adopted an integrated comprehensive emergency plan in 2005. The plan provides for coordinated response and unified command structure under the Makah Director of Public Safety (Police Chief). The handling of any emergency, including civil disturbance, falls under the plan. An example of the plan's implementation occurred in December 2005, when there was a water shortage emergency on the reservation due to a combination of unusual drought and storm damage. In response to the emergency, the Police Chief sought a Makah Tribal Council declaration of emergency, which placed the comprehensive emergency plan in effect.

3.1.2.2.2 Makah Fisheries Management Programs

Fisheries in Puget Sound, the Strait of Juan de Fuca, and nearshore coastal waters are co-managed by the Indian treaty tribes and the Washington Department of Fish and Wildlife (WDFW). Ocean fisheries in United States waters are regulated by the Pacific Fishery Management Council with NMFS oversight and approval under the Magnuson-Stevens Act. State and tribal biologists participate in developing the scientific information that guides the decision-making and deliberative processes of the Pacific Fishery Management Council and NMFS. Harvest of salmon is also governed internationally under the 1985 Pacific Salmon Treaty, developed through cooperation by tribes, state governments, United States and Canadian federal governments, and sport and commercial fishing groups. The treaty is implemented by the eight-member bilateral Pacific Salmon Commission, which includes representatives of federal, state, and tribal governments. The Pacific Salmon Commission does not regulate salmon fisheries, but provides regulatory advice and recommendations, and is a forum for the two countries to reach agreement on mutual fisheries issues.

The Makah Tribe regulates and coordinates its own fishery management program within its U&A. The Tribe manages fisheries for salmon, halibut and other bottom fish, rockfish, Pacific whiting, black cod/sablefish, shellfish, and other marine species off the Washington coast, in coastal rivers and bays, and in the Strait of Juan de Fuca.

According to the Makah Fisheries Management 2005 Annual Report (Makah Fisheries Management 2005), the following programs are under Makah Fisheries Management:

Groundfish Management Program. The groundfish management programs below cover Pacific halibut, blackcod (sablefish), Pacific whiting, yellowtail (rock fish), and bottom fish (groundfish):

- **Observer Program.** Since 2003, this program places an observer on fishing vessels to monitor mid-water and bottom trawl fisheries for bycatch of overfished species.
- **Marine Fish Port Sampler.** Also since 2003, this program is co-managed with WDFW (Bryant 2007). The data collected are critical for yearly stock assessments and coast-wide management of groundfish by the Pacific Fishery Management Council.
- **Yelloweye Rock Fish Bycatch Studies.** Studies are conducted on the potential to reduce the incidence of yelloweye rock fish bycatch when fishing for halibut by using three different bait types (started in 2005, under a Pacific States Marine Fisheries Commission grant) (Makah Fisheries Management 2005; Bryant 2007).
- **Shellfish Management.** This includes three dive fisheries targeting sea cucumbers and red and green sea urchins, as well as a Dungeness crab fishery in the Strait of Juan de Fuca that was implemented in 2005 (Bryant 2007).
- **Other Fisheries.** Other fisheries being explored include sardines and previously non-targeted species of flatfish (arrowtooth flounder).

Salmon Management Program. In 2005, Makah fisheries management program staff participated in the pre-season planning process for salmon management with the Pacific Fishery Management Council. In July, the Makah salmon management program staff initiated an evaluation of the all-species portion of the treaty ocean troll fishery. Salmonid fisheries include Chinook, sockeye, coho, pink, chum, and steelhead. The program includes research and monitoring, primarily of the status and progress toward recovery of local salmon stocks. Results of research and monitoring are provided to technical and policy staff for improved management. The program also provides information for use in restoration projects.

Marine Mammal Management Program. The Makah fisheries management staff are responsible for the management of marine mammals, important biological and cultural resources within the Makah U&A. Activities include participation with the International Whaling Commission (IWC) Scientific Committee and three subcommittees: Aboriginal Whaling Management Procedure; Bowhead, Right, and Gray Whale; and Environmental Concerns. The tribal staff marine mammal biologist also participated in the Pacific Scientific Review Group, which provides advice to NMFS and FWS on marine mammal stock assessments and review of sources of mortality. Other activities include conducting photographic-identification research of gray and humpback whales in the U&A, collecting biopsies from gray and humpback whales, and participating in a scientific exchange with the Chukotkan Region of the Russian Federation in 2006 to evaluate the logistics of conducting an intensive ‘stinky whale’ research program.

Scientific Research and Collaboration Program. Under this program, the Tribe and WDFW conduct a joint research project on Puget Sound herring stocks. The Tribe has completed a series of other research projects with federal, state, and tribal governmental agencies. Additional projects are focused on developing new fisheries (such as Pacific cod and sardine) and groundfish stocks in the Makah U&A and geoduck aquaculture in Makah Bay area.

Hatchery Operations Program. The hatchery operations program raises and rears six salmonid stocks, including two stocks of steelhead, two stocks of Chinook, coho, and sockeye.

Sustainable Resource Management Program. Activities include OCNMS Advisory Committee; Pacific Fishery Management Council; Marine Protected Areas Federal Advisory Committee; essential fish habitat, low impact development; Environmental and Marine Sciences Youth Development Program; United States Environmental Protection Agency (EPA) Data Management Network; Makah Environmental Policy Act development; Coastal Zone Management Plan development; Derelict fishing gear removal; and cooperation with Coast Guard environmental assessment of breakwater development.

Water Quality. This program samples various water systems to collect a range of data including dissolved oxygen, salinity, pH, conductivity, and turbidity.

Freshwater Habitat Enhancement Program. Principal activities of this program include participating with other tribal departments regarding on-reservation planning, development, and resource extraction projects that affect freshwater resources; participating in habitat enhancement with WDFW under the state of Washington Forest Practices Act; identifying, prioritizing, and implementing habitat rehabilitation projects benefiting aquatic habitat on the Makah Reservation and in the U&A; participating in recovery efforts of Lake Ozette Sockeye; and developing watershed planning and protection efforts with adjacent communities to protect aquatic resources on the Makah Reservation and U&A.

3.1.2.2.3 Makah Comprehensive Economic Development Strategies

The Makah Tribe's Comprehensive Economic Development Strategy (Makah Tribe 2005c; Makah Tribe 2006b) identifies the Makah Tribal Council as the approving body for economic development within the reservation. The Makah Tribe obtains most of its tribal income through marina and harbor development, Makah Forest Enterprise, and the Makah Business Enterprises.

Goals identified within the plan include the following:

- Determine the feasibility of and priority ranking for eight projects associated with marine and harbor development (marine expansion, haul-out facility, upgraded marine fuel float, aquaculture, graving dock, log dump expansion, Neah Bay harbor deep-water entry, and cruise ship facility).
- Develop a small business program for ancillary businesses that support, enhance, and fulfill needs associated with a new marina.
- Expand the forested land base for the Tribe.
- Study the feasibility of a marine fish hatchery.
- Provide academic and business training and education.
- Diversify the Makah fishing industry, specifically the whiting fishery.
- Identify new projects consistent with the Makah Tribal Land Use Committee, including a visitor center (that may be associated with an ocean-front cabin resort, motel, and new restaurant), road improvements, and a new development area that would provide a wellness/medical center, senior citizen apartments, clinic staff housing, baseball fields, and new Makah Tribal Council offices.

Other priorities included in the plan are a new clean water source for tribal use, projects that provide for downtown revitalization, Shi Shi Trail expansion, tribal communications network upgrades, a potential wave energy project, a potential wind generation development, and opportunities to provide value-added seafood processing.

3.1.2.2.4 Makah Forest Management Plan

The Makah Forest Management Plan (Makah Tribe 1999) was prepared to identify goals and objectives for maintaining a desired future condition for the Tribe's forest resources. The intent of the forest plan is to guide harvest of mostly second-growth timber while allowing for harvest of only small, scattered pockets of older timber (exceeding 100 years of age) in an attempt to keep the remaining, large, contiguous blocks of older timber intact. Annual harvests of 8.5 million board feet are expected to achieve this goal, while providing for a long-term sustainable timber harvest level. Approximately 25,735 acres (85 percent of the reservation) are managed for timber harvest, and timber sale revenues represent approximately 50 percent of non-grant (monies not received through federal grants administered by the BIA) tribal income.

3.2 Water Quality

3.2.1 Introduction

The following section describes the management and existing condition of water resources in the project area. Topics addressed include drinking water sources, shellfish harvest areas, and existing practices for the prevention of and response to spills of fuel and other contaminants. This section also addresses solid waste disposal as it relates to options for disposal of a whale carcass. Ocean currents and nearshore mixing are discussed in Section 3.3 (Marine Habitat and Species).

3.2.2 Regulatory Overview

The federal Clean Water Act (33 USC 1251 et seq.) establishes standards and regulations for protecting the quality and beneficial uses of the nation's waterways and regulates navigable waters of the United States. Federal agencies responsible for enforcing the Clean Water Act include EPA and the Army Corps of Engineers. On the Makah Reservation, EPA has delegated authority under Sections 303(c) and 401 (both water quality standards and implementation plans and dredge and fill permits), of the Clean Water Act to the Makah Tribe. On the Makah Reservation, Makah Health Code Title III states that "it shall be a violation [of the Health Code] to conduct activities in the watershed which may degrade the physical, chemical, microbiological, viral, or radiological quality of the source of supply." All proposed activities require a written permit from the Tribal Council. EPA has retained some authority over Clean Water Act management on the Makah Reservation and administers programs such as the national pollutant discharge elimination system under Section 402.

Off the Makah Reservation, EPA has delegated authority over state waters (including Sections 401 and 402) to Ecology, which is responsible for the implementation of the Washington State Water Pollution Control Act (Revised Code of Washington [RCW] 90.48). This law is intended to maintain the highest possible standards for all waters of the state consistent with public health and enjoyment; the propagation and protection of wildlife, birds, game, fish and other aquatic life; and prevention and control of pollution within waters of the state of Washington. Ecology has set water quality standards to protect the beneficial uses of surface waters. Ecology has established fresh and marine water quality standards for fecal coliform bacteria (an indicator of fecal contamination); dissolved oxygen; total dissolved gas; temperature; pH; turbidity; aesthetics; and toxic, radioactive, and deleterious materials (WAC 173-210A).

Ecology routinely collects marine water quality data as part of the long-term Marine Waters Monitoring Program, initiated in 1967. Ecology uses these long-term data to assess marine water quality in Washington State, including coastal estuarine areas represented by Willapa Bay and Grays Harbor (Ecology 2002). The agency uses these data to differentiate inter-annual and seasonal variations from those due to human activities at specific locations. Ecology uses the data primarily to maintain the federal Clean Water Act 303(d) list of impaired waterbodies throughout the state and 305(b), the report describing the overall status of the waters of the state.

3.2.3 Existing Conditions

The primary saltwater resources in the project area include the Pacific Ocean from the mouth of the Strait of Juan de Fuca to the exclusive economic zone (EEZ) boundary and the western portion of the Strait of Juan de Fuca that includes the Makah Tribe's U&A (Figure 3-1). The EEZ extends up to 200 miles offshore, and coastal states have the right to explore, exploit, and manage within its limits. Freshwater resources in the project area occur in portions of Water Resource Inventory Areas 20 (Soleduck-Hoh) and 19 (Lyre-Hoko), and portions of the Makah Reservation fall within both. Major rivers include the Wa'atch and Sooes Rivers, the two main tributaries that drain into Makah Bay from the Makah Reservation, as well as the Ozette River, which runs from Ozette Lake to the nearshore area of the Olympic National Park (Figure 3-2). These rivers all occur in Water Resource Inventory Area 20. Numerous additional smaller streams in the project area drain to the Pacific Ocean, the Strait of Juan de Fuca, and Neah Bay. Based on information Ecology provided, these waterbodies have extraordinary water quality, and none of the designated uses (shellfish harvesting, primary contact recreation, wildlife habitat, harvesting, commercial navigation, boating, and aesthetics) is restricted (WAC 173-210A).

Ecology implements marine water quality management activities in Puget Sound and the outer coastal estuaries based, in part, on periodic quantitative water quality monitoring data. The data are also used for interdisciplinary efforts aimed at assessing the health of marine ecosystem components, ranging from eelgrass to salmon, because these organisms live in and are affected by marine water and its quality.

Ecology has not listed the Pacific Ocean, the Strait of Juan de Fuca, Neah Bay, or any of the rivers and streams within the project area as impaired for water or sediment quality parameters. These parameters generally include temperature, dissolved oxygen, pH, nutrients, bacteria, metals, and toxic substances (WAC 173-210A). In addition, Ecology and the Washington Department of Health have monitored for fecal coliform bacteria at beaches along Neah Bay and

Hobuck and Sooes Beaches (Figure 3-2). Very low levels of fecal coliform bacteria were recorded on these beaches, indicating little or no contamination (Ecology 2005a).

3.2.3.1 Drinking Water Sources

Drinking water sources for the Makah Reservation (with three primary settlement areas) are local rivers and the Educket Reservoir (United States Bureau of Reclamation 2006). The difficulties in collecting and distributing water suitable for drinking led to a moratorium on residential and commercial building on the reservation in 2000. The Bureau of Reclamation is considering the following options for increasing the availability of drinking water for current use and planned growth:

- Reclamation of Educket Reservoir
- Development of an additional collection system from three creeks along Cape Flattery
- Construction and operation of a reverse osmosis desalinization plant, which would collect water from the Wa'atch River intertidal zone south of the existing tribal center through an underground collection system near the outlet of the Wa'atch River

3.2.3.2 Shellfish

The Washington Department of Health regularly monitors shellfish areas because shellfish tend to accumulate pollutants and generally reflect long-term (chronic) water quality concerns (Ecology 2002). This information supplements the periodic samples Ecology takes at discrete water quality monitoring stations. The state Surface Water Quality Standards also contain criteria to reduce the chance of people becoming ill from eating shellfish or from swimming or wading in waters of the state. Makah Fisheries and the Makah Port Authority also monitor shellfish for contamination. Managers can close shellfish beds to human harvest for two reasons: the presence of human fecal coliforms (typically from failing septic systems) and toxic algal blooms. Fecal coliforms are used as indicators of contamination. Although generally not harmful themselves, they indicate the possible presence of pathogenic (disease-causing) bacteria, viruses, and protozoans that live in the digestive systems of humans and other animals (EPA 1997). Toxins associated with algal blooms include domoic acid, saxitoxin, and gonyautoxin derivatives. These naturally occurring neurotoxins may be harmful if consumed in significant concentrations, which can occur when people eat crabs or shellfish that have accumulated toxins by feeding on toxic algae.

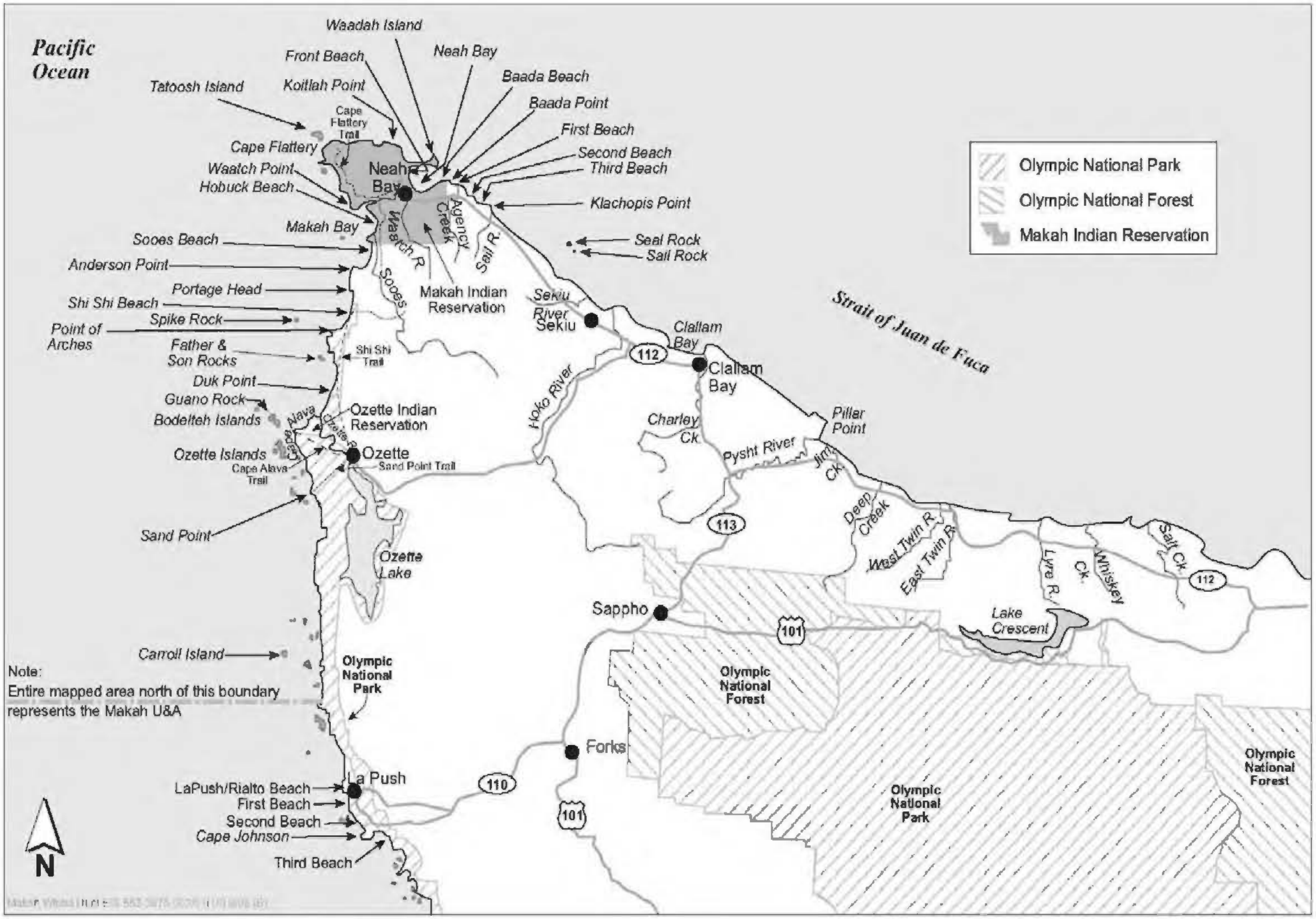

Figure 3-2. Topographic Features of Interest

Neither WDFW nor the Washington Department of Health has identified or mapped any recreational or commercial shellfish beds within the project area along the Pacific Ocean (WDFW 2005a). Subsistence shellfish gathering takes place at Neah Bay, Makah Bay, and other relatively rocky areas on the reservation. Butter clams, steamer clams, and cockles are gathered on the west and east ends of Neah Bay. A horseclam bed occurs on Front Beach, near where the gray whale was landed in 1999. A pilot project by Makah Fisheries Management with geoduck aquaculture is also underway on Front Beach. Additional species, such as mussels, are gathered in intertidal rock areas throughout the reservation. The only commercial activity associated with this gathering is limited local selling.

The Washington Department of Health previously closed shellfish harvesting in the southern portions of Neah Bay due to potential pollution (primarily fecal coliform) associated with a sewer outfall and marina located in this area (Washington Department of Health 2005). By summer 2006, however, most shellfish harvest was open (WDFW 2006a). The Department of Health also recently closed waters along the Pacific Ocean within the project area due to the results of biotoxin tests (Washington Department of Health 2005). In general, the beaches located within the project area are hotspots for algal blooms, at least partially because of the nutrient-rich waters and mixing that occur at the mouth of the Strait of Juan de Fuca (WDFW 2004). Algal blooms are triggered by a complex interaction of environmental conditions, and the duration and timing of closures are difficult to predict.

3.2.3.3 Spill Prevention

The project area includes national and international shipping lanes and is open to recreational boating and commercial and recreational fishing. Wherever marine vessels are present, there is a risk that pollutants from boat emissions and/or spills will enter the water. As discussed above, however, Ecology has not listed any of the waters of the project area as impaired for water or sediment quality parameters; some impairment of marine waters has, however, occurred during major spill events.

Currently several organizations are prepared to respond to emergency spills in Puget Sound, the Strait of Juan de Fuca, and off the Washington coast (Ecology 2003a). These organizations include National Response Corporation Environmental and Marine Spill Response and Clean Sound Cooperative. As part of Ecology's Spill Prevention, Preparedness, and Response Program, it stations a rescue tug in Neah Bay seasonally to assist tankers and cargo ships that are drifting or need support during bad weather (Ecology 2005b). In general, pollutants (such as hydrocarbons) are associated with gasoline and diesel engines, as well as vessel traffic, and they enter the environment from spills and/or exhaust. Smaller oil spills could occur during fueling and maintenance operations at docks.

The nearshore portion of the Makah U&A corresponds largely with the designated area to be avoided for the OCNMS. This designation is meant to reduce the potential for catastrophic oil spills by encouraging big ships (carrying large amounts of bunker fuel) to avoid the nearshore areas of the coast. While this designated area does not encompass the entire OCNMS, its boundaries protect sanctuary resources most at risk from vessel casualties, while being compatible with existing vessel traffic lanes (Galasso 2000). See Section 3.1.1.1.3, Olympic Coast National Marine Sanctuary, Current Issues, Area to be Avoided, and Section 3.13.2, Transportation, Regulatory Overview.

3.2.3.4 Solid Waste Disposal

There is a landfill at Neah Bay that is used solely by residents and businesses on the Makah Reservation. The facility, which is under the jurisdiction of the Makah Tribal Council, is currently the only landfill in Clallam County that accepts municipal solid waste (Parametrix 2007). In the 1980s, a solid waste management plan for the Makah Reservation recommended closure of the Neah Bay landfill and construction of a transfer station to haul waste to the closest permitted disposal facility (Paul S. Running and Associates 1983). A comprehensive solid waste management plan update prepared for Clallam County indicated that siting a new municipal solid waste landfill in Clallam County is not feasible due to various factors including climate, geography, land use, and the availability of a lower-cost option to export waste (Parametrix 2007). The Makah Tribe has recently obtained funding to design a new transfer station at the site of the Neah Bay landfill and is proceeding with plans to close the landfill (Parametrix 2007).

The two primary generators of animal carcasses in Clallam County are the Humane Society (in Port Angeles) and Battelle Marine Sciences Laboratory (near Sequim). Both organizations use Petland Crematorium in Aberdeen for cremation of animals. Battelle sends hazardous carcasses to Pacific Marine Lab for disposal. The Clallam County Road Department buries roadkill carcasses at remote locations on public lands scattered throughout the county (Parametrix 2007).

3.3 Marine Habitat and Species

3.3.1 Introduction

The marine environment off the coast of Washington is highly energetic, productive, and dynamic, supporting a wide range of invertebrates, fish, and marine wildlife. The ecological importance of the habitat was acknowledged in the OCNMS designation (NOAA 1993). High biological productivity, diversity of habitats, the wide variety of marine mammals and birds living in or migrating through the area, and the presence of endangered and threatened species and essential habitats were identified as some of the biological resources giving the Sanctuary particular value (Section 3.1.1.1, Olympic Coast National Marine Sanctuary, for more detail). The dynamic physical processes and high levels of disturbance experienced along the Washington coast, including the project area, affect ecosystem structure, ecological interactions, and species' recruitment dynamics. Understanding the physical processes in the project area will inform the analysis of potential direct and indirect effects to the ecosystem from activities associated with the proposed hunt.

The description of the marine ecosystem that follows is organized by pelagic environment (open water column) and benthic environment (bottom substrata), identifying physical features and processes and biological resources associated with each environment. ENP gray whales and other marine wildlife in the project area are described in more detail in other sections (Section 3.4, Eastern North Pacific Gray Whale, and Section 3.5, Other Wildlife Species).

3.3.2 Regulatory Overview

The conservation, preservation, and management of marine habitat and biological resources in the project area occur under several statutory and regulatory authorities, the most pertinent of which are detailed below.

Under federally granted Coastal Zone Management Act authority, Ecology administers Washington State's coastal zone management program on the state's shoreline (under the Shoreline Management Act) and waters (under the Aquatic Management Act), except for excluded federal lands (i.e., lands that the federal government owns, leases, holds in trust, or otherwise has sole discretion to determine their use, such as the Olympic National Park coastal strip and the Makah and Ozette Reservations).

Under the National Marine Sanctuaries Act and regulations, marine plants and algae, invertebrates, plankton, and fish are protected and conserved as Sanctuary resources within the boundaries of the OCNMS. Federal designation and management of the OCNMS and protection of Sanctuary resources by NOAA's National Marine Sanctuaries Program under the National Marine Sanctuaries Act, including protection and management of habitat such as bottom formations and substratum, is described above in Section 3.1.1.1, Olympic Coast National Marine Sanctuary. Federal designation and management of the rocks and islands comprising the Washington Islands National Wildlife Refuges are also described above in Section 3.1.1.2, Washington Islands National Wildlife Refuges.

The Pacific Fishery Management Council and NMFS are the primary federal management authorities for managing and conserving living marine resources, including marine fish and plants, out to 200 miles from shore under the Magnuson-Stevens Act and the North of Falcon planning process. Northwest Indian tribes and WDFW also participate in fisheries management. Under the Magnuson-Stevens Act, NMFS and the Pacific Fishery Management Council also protect habitat identified as essential for commercially important fish species. Essential fish habitat is defined under the Magnuson-Stevens Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC 1802 Section 3(10)). Regulatory guidelines elaborate that the words 'essential' and 'necessary' mean that essential fish habitat should be sufficient to "support a population adequate to maintain a sustainable fishery and the managed species' contributions to a healthy ecosystem." The Pacific Fishery Management Council describes essential fish habitat in their fishery management plans, minimizes impacts to essential fish habitat resulting from fishing activities, and consults with NMFS about activities that might affect essential fish habitat. The council may use fishing gear restrictions, time and area closures, harvest limits, and other measures to lessen adverse impacts on essential fish habitat. The Magnuson-Stevens Act also encourages NMFS to designate habitat areas of particular concern. These are specific habitat areas, a subset of the much larger area identified as essential fish habitat, that play a particularly important ecological role in the fish life cycle or that are especially sensitive, rare, or vulnerable. Designating habitat areas of particular concern allows the Pacific Fishery Management Council and NMFS to focus their attention on conservation priorities during review of proposals, affords those habitats extra management protection, and gives the fish species within these areas an extra buffer against adverse impacts.

Under the ESA, NMFS and FWS are responsible for the conservation of threatened and endangered species, including fish, wildlife, and plants under their jurisdiction. The agencies are required to identify and designate critical habitat for threatened and endangered fish and wildlife species under their jurisdictions. ‘Critical habitat’ is (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. Under Section 7 of the ESA, all federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat. These complementary requirements apply only to federal agency actions, and the latter apply only to habitat that has been designated. A critical habitat designation does not set up a preserve or refuge; it applies only when federal funding, permits, or projects are involved.

3.3.3 Existing Conditions

3.3.3.1 Pelagic Environment

The term ‘pelagic’ is commonly used in reference to the upper water column of the open ocean that is not in association with the ocean bottom or bathymetric features. The oceanographic processes in the action area are generally large in scale, with ocean circulation driven by a major eastern boundary current system, the California Current System. Local conditions are energetic, dynamic, and affected by oceanographic processes operating across a spectrum of temporal and spatial scales. These physical processes and their pronounced effects on the area’s biota are described in the following sections.

3.3.3.1.1 <u>Physical Features and Processes</u>

Large-Scale Ocean Currents

The project area on the Washington coast is situated in an eastern boundary current system where the North Pacific Current divides into the northward flowing Alaska Current and the California Current System to the south (Hickey 1998; Gramling 2000). The California Current System is composed of the California Current, the California Undercurrent, the wintertime Davidson Current, and possibly a subsurface Washington Undercurrent. The relative strength of these currents and their influence on the temperature, salinity, flow, and productivity of the project area varies considerably over seasonal and interannual time scales (Hickey 1998; Hickey and Banas 2003; MacCall et al. 2005). The components of the California Current System are described below, along with discussion of how they contribute to the dynamic physical environment of the project area.

The California Current extends up to 600 miles offshore and ranges from the Pacific Northwest south to Baja California (Hickey 1979; Miller 1996; Hickey 1998; Burtenshaw et al. 2004). The California Current is a major force in shaping local ecosystems by affecting upwelling, downwelling, and biological production along the Pacific coast (Airamé et al. 2003). Despite being one of the most studied oceanographic systems in the Pacific Ocean, the mechanisms underlying the variability of this meandering current are still obscurely understood and inadequately sampled (Miller 1996). Flow of the California Current is strongest in the summer and early fall and weakest in the winter (Hickey 1998; Gramling 2000; Hickey and Banas 2003). The California Current is strongly affected by seasonal wind forcing (Thomas et al. 2003), and shifts in regional climate can have dramatic effects on its flow (e.g., during El Niño events, the flow of the California Current is unusually weak; Hickey 1979; Gramling 2000). For further description of El Niño events, see El Niño Southern Oscillation Cycle below in this section.

The California Undercurrent is a permanent, relatively narrow (6- to 25-mile), deep subsurface feature that flows northward over the continental slope from Baja California to Vancouver Island (Reed and Halpern 1976; Hickey 1998; Neander 2001). The California Undercurrent transports warm, saline, low-oxygen, equatorial water to the northern Pacific, with strongest northward flows in the summer or early fall and minimum flows in the spring (Hickey 1998; Neander 2001; Hickey and Banas 2003). During El Niño years, when flow of the California Current is weakened, the California Undercurrent is unusually enhanced (Hickey 1979; Gramling 2000).

The Davidson Current is an inshore, seasonal, northward flowing feature that develops when the southward flowing California Current is weaker and situated further offshore. The Davidson Current is approximately 60 miles wide, extends seaward of the continental slope, and transports warm, saline, low-oxygen, high-phosphate, equatorial water to the north (Gramling 2000; Hickey and Banas 2003). The Davidson Current develops along the Washington coast in September, is well established in January, and dissipates by May (Purdy 1990; Hickey and Banas 2003). The strongest flow of the current occurs during the winter months (Hickey and Banas 2003). There is speculation that the Davidson Current is a surface expression of the California Undercurrent (Hickey 1979).

There is some indication that a southward undercurrent, the Washington Undercurrent, occurs over the continental slope of Washington and Oregon in the winter (Werner and Hickey 1983; Purdy 1990). This undercurrent is located 1,000 to 1,600 feet deep, deeper than the northward-flowing California Undercurrent (Hickey 1998; Hickey and Banas 2003).

Dynamic Processes and Variability

Seasonal Variability, Upwelling, and Down-welling

Seasonal variations in the oceanography of the project area occur in response to various forcing events, including solar heating and cooling, wind mixing, freshwater runoff, and coastal upwelling (Brueggeman et al. 1992). The seasonal pattern of the physical environment is typified by periods of intense coastal upwelling (April through September) and periods of relaxed winds (October through March) punctuated by strong winter storms (November to March).

Upwelling is a wind-driven, dynamic process that brings nutrient-rich deep water to the surface and transports nutrient-poor surface waters offshore (Mann and Lazier 1991). During spring and summer, northwesterly winds and the earth's rotation combine to push the surface waters offshore. This, in turn, results in the movement of deeper cold water upward into surface waters, introducing nitrate, phosphate, and silicate nutrients essential for phytoplankton production. Periods of wind relaxation lasting two to six days may alternate with upwelling-favorable conditions during the spring, contributing to dynamic and patchily distributed nutrient availability and productivity. The strongest upwelling in the project area occurs during July and August (Brueggeman et al. 1992; Airamé et al. 2003). Prolonged periods of wind relaxation may occur from late summer to early fall. The timing and intensity of regional upwelling varies from year to year (Huyer et al. 1979; Strub and James 1988) and with changes in long-term climatic phenomena (El Niño Southern Oscillation Cycle and Pacific Decadal Oscillation in this section, below) (Huyer and Smith 1985; Barth and Smith 1997).

In October or November, there is a shift in wind direction that results in predominant winds that flow from the east/southeast (Norman et al. 2004), resulting in the onshore transport of surface waters and the conditions typical of fall and winter that favor downwelling (Hickey 1998). During periods of diminished upwelling or downwelling, the survivorship and reproductive success of planktivorous invertebrates and fishes decrease in response to reduced plankton abundance and productivity (Airamé et al. 2003). Between late November and mid-March, low pressure systems from the Gulf of Alaska generate strong winter storms, southerly winds, and large waves in the Pacific Northwest (Strub and Batchelder 2002; Airamé et al. 2003). These winter storms create intense vertical mixing, usually persist for only a few days, are important sources of localized oceanographic disturbance.

Eddies and Fronts

During the spring, the large counterclockwise Juan de Fuca Eddy (or Tully Eddy; Tully 1942) develops offshore of northern Washington at the mouth of the Strait of Juan de Fuca (Burger 2003; Hickey and Banas 2003). The eddy forms as a result of the interaction between effluent from the Strait of Juan de Fuca, southward wind-driven currents along the continental slope, and the bathymetry of the region (Hickey and Banas 2003). At its maximum, the eddy has a diameter of approximately 30 miles, and it is the dominant circulation pattern off northern Washington until its decline in the fall (Freeland and Denman 1982; Hickey and Banas 2003). The eddy upwells deep, cold, nutrient-rich water into surface waters, resulting in locally enhanced biological productivity (Freeland and Denman 1982; Thomson et al. 1989; Freeland 1992).

Ephemeral eddies and offshore filaments of variable duration (days, weeks, months, years) are also generated by meanders of the California Current, bathymetric features, and coastal upwelling events. Such ephemeral features are most common during summer and fall in the California Current System (Huyer et al. 1998; Barth et al. 2000; Strub and James 1988; Ressler et al. 2005). As with the Juan de Fuca Eddy, ephemeral counterclockwise eddies stimulate enhanced productivity by drawing cooler, nutrient-rich waters to the surface, while clockwise eddies are associated warmer, nutrient-poor, and less productive conditions. Ephemeral eddy-like features are also generated by the Columbia River plume (Columbia River Plume below in this section) (Yankovsky et al. 2001; Berdeal et al. 2002). Subsurface eddies are generally observed within and overlying submarine canyons off the Pacific coast (Hickey and Banas 2003), providing an effective mechanism for locally increased productivity and the suspension of sediment and organic detritus over these features (Hickey 1995).

Oceanic ‘fronts’ are zones of high water property gradients (e.g., gradients in temperature, salinity, and nutrients). Ephemeral fronts often exist at the interface between upwelled water and ambient coastal water, and the onset and relaxation of upwelling may result in the cross-shelf transport of planktonic organisms associated with these gradients. Persistent fronts tend to occur regularly at certain locations along the coast (e.g., capes and points) and may extend 60 miles offshore (Short 1992). Ephemeral fronts generated off of Vancouver Island may extend southward off of the Washington coast near the project area (Freeland and Denman 1982).

Columbia River Plume

The Columbia River plume, through its influence on sea surface salinity, has a major effect on the coastal oceanography of the Pacific Northwest, including the project area. In general, salinity increases southward along the Pacific coast (Hickey and Banas 2003). However, the low-salinity plume of freshwater discharge from the Columbia River constantly changes direction, depth, and width in response to variation in discharge and fluctuations in local wind strength and direction (Hickey et al. 1998; Berdeal et al. 2002; Hickey and Banas 2003). In spring and summer, the plume moves southward, well offshore of the Oregon shelf (Hickey and Banas 2003) and has no influence on the coastal oceanography of the project area. During the winter, however, the plume flows northward and can generate local currents with magnitudes on the order of wind-driven currents in the near-surface layer (Hickey et al. 1998). In addition to seasonal variability, the structure and magnitude of the Columbia River plume has significant interannual and long-term variability (Hickey and Banas 2003). For example, in years of high snowmelt in the Pacific Northwest, freshwater generated from the plume can influence coastal oceanography for prolonged periods.

El Niño Southern Oscillation Cycle

El Niño Southern Oscillation events (including both El Niño and La Niña events) produce extreme interannual anomalies in global climate, atmospheric circulation, and oceanographic processes (Jacobs et al. 1994; Schwing et al. 1996). El Niño Southern Oscillation conditions typically last 6 to 18 months, although they can persist for longer periods (Barber and Chavez 1983; Lynn et al. 1998; Durazo et al. 2001; Schwing et al. 2002a; Schwing et al. 2002b). El Niño conditions occur when unusually high atmospheric pressure develops over the western tropical Pacific and Indian Oceans, and low sea level pressures develop in the southeastern Pacific (Trenberth 1997; Conlan and Service 2000). The trade winds consequently weaken in the central and west Pacific, reducing the normal east to west surface water transport. Upwelling along South America decreases, resulting in shoaling of the thermocline, increased sea surface temperatures, and diminished productivity across the mid to eastern Pacific (Donguy et al. 1982). Rainfall patterns also shift eastward across the Pacific, resulting in increased (sometimes extreme) rainfall across the southern United States and Peru (Conlan and Service 2000). La Niña is the opposite phase of El Niño in the El Niño Southern Oscillation Cycle. La Niña is characterized by strong trade winds that push the warm surface waters back across to the western Pacific (Schwing et al. 2000). Under these conditions there is increased upwelling along the eastern Pacific coastline, the thermocline in the eastern Pacific becomes shallower, and there is increased upwelling and productivity.

Although the direct effects of El Niño Southern Oscillation events are observed in the equatorial latitudes, significant correlations exist between the climate of the Pacific Northwest and El Niño/La Niña events (e.g., Pulwarty and Redmond 1997; Cayan et al. 1999). In the Pacific Northwest, El Niño events are characterized by increases in ocean temperature and elevated sea level (4 to 12 inches), enhanced onshore and northward flow, and reduced coastal upwelling (Crawford et al. 1999; Smith et al. 1999; Freeland 2000; Airamé et al. 2003). Historically, the region was impacted by strong El Niño events in 1940, 1958, 1983, 1992, 1997 to 1998, and 2004 to early 2005 (Hayward 2000; Lyon and Barnston 2005). The 1997 to 1998 El Niño was one of the largest ocean perturbations in the historical record, inducing a 4-degree to 5-degree Fahrenheit (F) warming of sea surface temperatures over the historical average and profoundly affecting the productivity and marine ecology of the region (Castro et al. 2002; Airamé et al. 2003; Childers et al. 2005; Zamon and Welch 2005). This El Niño was immediately followed by an equally strong, cold La Niña event in 1999. For the ENP gray whale, Section 3.4.3.3, Distribution and Habitat Use, discusses the effect of oceanic climatic cycles, including El Niño/La Niña events, on gray whale distribution and habitat use; Section 3.4.3.4.2, Stranding Data, discusses the potential relationship between the 1997 and 1998 El Niño events and the ENP gray whale unusual mortality event.

<u>Pacific Decadal Oscillation</u>

The Pacific Decadal Oscillation is a long-term (approximately every 20 to 30 years) climatic pattern correlated with alternate regimes of sea surface temperature, surface winds, and sea level atmospheric pressure (Mantua 2002; Mantua and Hare 2002). The Pacific Decadal Oscillation is often described as a long-lived, El-Niño-like pattern of Pacific climate variability with both warm and cool phases (Mantua 2002; Mantua and Hare 2002; Airamé et al. 2003; Minobe et al. 2004). There are, however, noteworthy distinctions between the Pacific Decadal Oscillation and El Niño Southern Oscillation-induced events: (1) Pacific Decadal Oscillation regimes can persist for 20 to 30 years, in contrast to the comparatively shorter duration of El Niño Southern Oscillation events (typically up to 18 months) (Minobe 1997; Minobe 1999; Hare and Mantua 2000; Mantua and Hare 2002); (2) the ecosystem effects of the Pacific Decadal Oscillation are more pronounced in temperate latitudes (Hare and Mantua 2000); and (3) the mechanisms controlling the Pacific Decadal Oscillation are unknown, while those underlying El Niño Southern Oscillation variability have been well resolved (Mantua and Hare 2002). During warm Pacific Decadal Oscillation regimes, the western and central North Pacific Ocean typically exhibit cold sea surface temperature anomalies, while the eastern Pacific (including the project area) exhibits above-average temperatures and reduced productivity. The opposite conditions exist during cool Pacific Decadal Oscillation regimes. The Pacific Decadal Oscillation has been correlated with markedly different regimes of Columbia River discharge (Mantua et al. 1997), ocean productivity, zooplankton species composition, and forage fish and salmonid recruitment in the Pacific Northwest (e.g., Hare et al. 1999; Tanasichuk 1999; Botsford 2001; Mueter et al. 2002; Gustafson et al. 2006). The Pacific Decadal Oscillation regime shifts are abrupt, with observed shifts occurring in 1925, 1947, and 1977 (Hare 1996; Minobe 1997). The most recent shift, from a warm to a cool phase, occurred in 1998 (Airamé et al. 2003; Peterson and Schwing 2003; Childers et al. 2005; Gómez-Gutiérrez et al. 2005). For the ENP gray whale, Section 3.4.3.3, Distribution and Habitat Use, discusses the effect of oceanic climatic cycles, including the Pacific Decadal Oscillation, on gray whale distribution and habitat.

3.3.3.1.2 Biological Resources

Phytoplankton

The biological productivity and composition of the project area is best characterized as diverse, variable, and patchily distributed owing to the dynamic physical processes described above which vary across a spectrum of temporal and spatial scales. Phytoplankton (freely floating photosynthetic organisms) are responsible for the bulk of the primary production in the ocean (the conversion of inorganic carbon to organic matter) and form the basis of the pelagic ecosystem. The distribution and concentration of phytoplankton are affected by ocean currents, vertical mixing, and the rate of photosynthesis. The intensity and quality of light, the availability of nutrients, and seawater temperature all influence rates of photosynthesis (Valiela 1995). The Pacific Northwest coast supports high phytoplankton production, stimulated by the upwelling of nutrient-rich waters and retention of phytoplankton by local oceanographic currents and bathymetric features (Sutor et al. 2005). In general, the Washington coast experiences two seasonal peaks in phytoplankton production; the first occurs from February to April, and the second occurs in October. There is, however, considerable spatial and temporal variability in the production and distribution of phytoplankton caused by the physical oceanographic processes described above. For example, during an El Niño event, less upwelling occurs along the Pacific Northwest, fewer nutrients are available for phytoplankton growth, and phytoplankton concentration may decrease by as much as 70 percent compared to an average year (Wheeler and Hill 1999; Thomas and Strub 2001).

In addition to controlling the distribution and concentration of phytoplankton, physical oceanographic processes also affect the species and size composition of phytoplankton in the water column. For example, the onset and relaxation of upwelling events result in dramatic shifts in the phytoplankton community within the California Current System. Newly upwelled water along the shelf is composed chiefly of high concentrations of large, chain-forming diatoms. Following upwelling events, the phytoplankton community is predominantly composed of reduced concentrations of small phytoplankton species (less than 5 microns in size) (Sherr et al. 2005) better adapted to survival in low-nutrient conditions. Similarly, during low productivity conditions induced by El Niño events, 80 to 90 percent of the phytoplankton community along Pacific Northwest shelf waters consists of these smaller phytoplankton species (Corwith and Wheeler 2002; Sherr et al. 2005).

Zooplankton

Zooplankton are a taxonomically diverse group of organisms that consume phytoplankton (as well as other zooplankton). Juvenile crabs (megalopae), copepods, amphipods, euphausiids, and chaetognaths tend to dominate the near-surface zooplankton community (Peterson 1997; Reese et al. 2005; Swartzman et al. 2005). The distribution of zooplankton along the coastline can be described as spatially and temporally patchy, reflecting the variable concentration and distribution of phytoplankton prey, as well as the underlying dynamic physical environment (Reese et al. 2005; Ressler et al. 2005). The highest zooplankton concentrations typically are found within 90 miles of the coastline (Swartzman and Hickey 2003; Ressler et al. 2005; Swartzman et al. 2005) in the upper 66 feet of the water column over the inner and mid shelf (Peterson and Miller 1975; Peterson and Miller 1977). Zooplankton densities along the Pacific Northwest are highly seasonal, with summer densities ten times greater than those observed during the winter months (Burger 2003; Reese et al. 2005). Copepods form the largest fraction of the zooplankton biomass. Although smaller copepods are numerically dominant (e.g., *Acartia* spp.), larger copepods comprise most of the zooplankton biomass (e.g., *Calanus* spp.) (Strickland 1983) and tend to feed on the diatoms that dominate under upwelling conditions. Euphausiids, amphipods, and mysids are also important components of the zooplankton assemblage (Strickland 1983). Ephemeral, seasonal, interannual, and interdecadal physical oceanographic processes (described above) largely control the abundance, distribution, and species composition of zooplankton in the region (e.g., Batchelder et al. 2002; Botsford 2001; Peterson 1999; Peterson and Miller 1977; Peterson and Keister 2003; Tanasichuk 1999).

Fish and Invertebrates

The productivity of the project area is strongly affected by the California Current System and the dynamic physical oceanographic processes inducing variability within the California Current System, as noted in previous discussions. The high productivity of the region produces a diverse plankton community that, in turn, supports a large assemblage of pelagic marine fish and invertebrates dependent upon this spatially and temporally patchy planktonic food supply (e.g., diatoms, dinoflagellates, copepods, euphausiids, and other organisms). Marine fish and invertebrate species associated with the pelagic environment include coastal pelagics, salmonids, and highly migratory species (Table 3-1). Various physical features within the project area such as ocean currents, upwelling, the Columbia River plume, fronts, and eddy features influence the distribution and abundance of pelagic prey species, as well as that of their fish and invertebrate predators (Doyle 1992; Dower and Perry 2001; Nasby-Lucas et al. 2002; Williams and Ralston 2002; Bosley et al. 2004; Emmett et al. 2004; Emmett et al. 2006). The distribution and abundance of pelagic fish and invertebrate species also are profoundly affected by inter-annual and inter-decadal climatic variations such as El Niño/La Niña or Pacific Decadal Oscillation (Hickey 1993). For example, dramatic changes in species assemblages were observed during extreme El Niño/La Niña years (1998 to 2002) off northern Washington State to central Oregon. The pelagic community shifted from one dominated by southern species (mackerels and hake) to one dominated by northern species (squid, smelts, and salmon), with the small pelagic species (sardines, herring, and anchovy) showing no consistent trends in abundance over this time (Brodeur et al. 2005).

Coastal Pelagic Species

The coastal pelagic species in the project area include four finfish species (Pacific sardine, *Sardinops sagax*; Pacific [chub] mackerel, *Scomber japonicus*; northern anchovy, *Engraulis* *mordax mordax*; and jack mackerel, *Trachurus symmetricus*) and market squid (*Loligo opalescens*) (NOAA 1993; Pacific Fishery Management Council 2003a; Table 3-1). The distribution of coastal pelagic species typically depends on water temperature, but can vary both annually and seasonally (Pacific Fishery Management Council 2005a). For many of these species, occupancy zones may vary by life-history stage.

TABLE 3-1. ASSOCIATIONS AND TIMES OF OCCURRENCE FOR PELAGIC AND BENTHIC SPECIES POTENTIALLY PRESENT IN THE PROJECT AREA.

FISH	TYPICAL HABITAT	TIME OF OCCURRENCE
Coastal Pelagic Species		
Sardine/anchovy/herring	Pelagic (open water) schooling fish	Winter-summer
Mackerel	Pelagic, schooling fish	Spring-summer
Squid	Pelagic, shelf zone	Spring-summer
Salmon		
Pacific salmon and steelhead	Pelagic, nearshore, upwelling areas	Year-round
Sea-run bull and cutthroat trout	Pelagic, nearshore, upwelling areas	Fall through winter (returning adults); spring (juvenile outmigrants)
Highly Migratory Species		
Tuna	Pelagic, shelf and slope	Year-round
Shark	Pelagic, nearshore, upwelling areas	Year-round
Groundfish		
Rockfish	Demersal (on or near the bottom), nearshore, shelf, and slope rocky areas	Year-round
Thornyhead	Demersal, shelf or slope, soft-bottom areas	Year-round
Flatfish	Demersal, nearshore/shelf, and slope sandy, muddy, or gravelly bottoms	Year-round
Gadid	Pelagic/semipelagic, nearshore, and shelf in large inlets	Year-round
Shark	Pelagic, nearshore and shelf	Year-round
Skate	Demersal, shelf, mud or sand substrate	Year-round
Lingcod and cabezon	Demersal, nearshore, rocky, or steep slopes	Year-round
Sablefish	Demersal, shelf slope, sand, mud, or clay substrate	Year-round
Green sturgeon	Demersal, shelf slope, sand, mud, or clay substrate	Summer
Other Demersal Species		
Halibut	Demersal, shelf, sand, and gravel substrate	Year-round
Crustaceans: myssids, euphaussids, amphipods	Nearshore, sand/mud substrate	Year-round
Crab	Nearshore, sand/mud substrate	Year-round

The Pacific Fishery Management Council and NMFS identified essential fish habitat for coastal pelagic species based on the temperature range where the fish occur and on the geographic area where they are present at any particular life stage. This range varies widely according to ocean temperature. Identifying essential fish habitat for coastal pelagic species is also based on where these species have been observed in the past and where they may occur in the future.

The east-west boundary of essential fish habitat for coastal pelagic species includes all marine and estuary waters from the coasts of California, Oregon, and Washington to the limits of the EEZ and above the thermocline (Pacific Fishery Management Council 2006). A thermocline is the depth where water temperature changes relatively rapidly and separates less dense, warmer waters from denser, colder waters. Surface temperatures above the thermocline exhibit considerable variability, ranging from 50 to 79 degrees F. The northern essential fish habitat boundary is defined as the position of the 50-degree F isotherm, which varies seasonally and annually. The 50-degree F isotherm is a rough estimate of the lowest temperature where finfish are found; thus, it represents their northern boundary. In years with cold winter sea surface temperatures, the 50-degree F isotherm during February is around 43 degrees north latitude in the offshore zone and slightly farther south along the coast. In August, this northern boundary moves up to Canada or Alaska (Pacific Fishery Management Council 2006). Therefore, the northern extent of essential fish habitat for coastal pelagic species likely occurs south of the project area in winter. During spring and summer months, with the northward migration of the 50-degree F isotherm, essential fish habitat likely occurs within the project area.

Salmonid Species

All Pacific salmonid species exhibit varying forms of anadromy (they spend their early life stages in freshwater, migrate to the ocean to grow and mature, and return to freshwater as adults to reproduce). For further information on the life history and behavioral ecology of Pacific salmonid species, see Groot and Margolis (1991) and Emmett et al. (1991). Twenty-six population groups of West Coast salmon and steelhead (*Oncorhynchus* spp.) are currently listed as threatened (21) or endangered (5) under the ESA. Steelhead in Puget Sound were also recently proposed for listing as threatened (71 FR 15666, March 29, 2006). Threatened bull trout populations occur in major coastal rivers of Washington (64 FR 58913, November 1, 1999); although limited data exist regarding the distribution of bull trout in marine waters, they are known to migrate between these rivers and are expected to occur occasionally in the project area (U.S. Fish and Wildlife Service 2004). Although some of the ESA-listed species noted above might occur in the project area, there is no designated critical habitat within the project area, except for the freshwater habitat areas used by threatened Ozette Lake sockeye salmon. The depressed production of many West Coast salmonid stocks, particularly the ESA-listed stocks, is due to a combination of factors, including freshwater habitat degradation and unfavorable ocean conditions during the 1990s. The population sizes of some of these salmonid species have increased in recent years, presumably in part due to improved ocean survival conditions (Pacific Fishery Management Council 2003b). As noted above, run sizes of salmonid stocks over decadal time scales appear to be strongly affected by the Pacific Decadal Oscillation ocean climate cycle. Salmonid species are also influenced by El Niño events, with the effect depending on the preferred water depth of the given species. Salmon that prefer more shallow habitats, such as coho, are more likely to be affected by El Niño than other salmon species, such as Chinook (Pacific Fishery Management Council 2003b).

The Pacific Fishery Management Council and NMFS identified essential fish habitat for salmon in estuaries and marine areas extending from the shoreline to the 200-mile limit of the EEZ and beyond. In freshwater, salmon essential fish habitat includes all lakes, streams, ponds, rivers, wetlands, and other bodies of water that have been historically accessible to salmon (Pacific Fishery Management Council 2006). The Pacific Fishery Management Council may use gear restrictions, time and area closures, and harvest limits to reduce negative impacts on salmon essential fish habitat. Salmon essential fish habitat occurs throughout the year in the project area.

Highly Migratory Species

Highly migratory species include tuna, billfish, and sharks. These species exhibit a wide-ranging distribution throughout the Pacific Ocean and are not typically associated with the specific substrata or benthic habitats (e.g., kelp forests or rocky substrata). Rather, their distribution often reflects large-scale oceanographic features with preferred levels of physical characteristics (for example, temperature, salinity, and oxygen), or concentrations of preferred prey (Pacific Fishery Management Council 2003a).

For a general description of gray whale feeding on pelagic prey, see Section 3.4.3.1.3, Feeding Ecology and Role in the Marine Ecosystem. For a description of variable and dynamic gray whale habitat use and distribution in the project area related to pelagic prey distribution and climatic and ocean condition variability, see Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, Southern Portion of the Summer Range.

3.3.3.2 Benthic Environment

3.3.3.2.1 Physical Features and Processes

Substrata

Nearshore Habitats

As with the pelagic environment, nearshore benthic habitats are dynamic environments subject to energetic disturbances from climatic, oceanographic, and terrestrial processes. Nearshore habitat characteristics and species composition are strongly influenced by the dominant forms of marine algae, tidal range, depth, and type of substrate (Proctor et al. 1980). The nearshore habitats in the project area are composed of rocky shores, sandy beaches, and gravel beaches (Department of the Navy 2006). These habitats can be divided into several vertical zones: the splash zone, the upper intertidal zone (submerged for a short time and exposed to the widest range of temperatures), the mid-littoral zone (alternately submerged and exposed for moderate periods of time), the swash zone (submerged for approximately 12 hours per day), the low intertidal zone (exposed for brief periods of time during the lowest tides), and the subtidal zone (substrata below the lowest tides that are always submerged). These vertical zones reflect the intensity of the physical forces affecting nearshore habitats and structuring the ecosystems that inhabit them.

Coastal Benthos

The continental shelf off the project area varies from 15 to 40 miles wide, including habitats of hard and soft substrata. Beyond the depths of kelp beds (more than 100 feet), approximately 3 percent of the sea floor consists of hard-bottom substrata (Department of the Navy 2006). Hard-bottom habitats may be composed of bedrock, boulders, cobble, or gravel.

The Columbia River is a major source for sediment for soft-bottom habitats along the Pacific coastline. The sediment is initially deposited near the mouth of the Columbia River. As winter storms pass through the Pacific Northwest much of this sediment is transported northward along the coast resulting in a 30-foot-thick deposit of silt overlying the Washington continental shelf (Hickey and Banas 2003). Offshore soft-bottom habitats are composed primarily of silt and mud with sandy areas occurring closer to the coastline.

Submarine Canyons

The otherwise smooth bathymetry along the project area is broken by two submarine canyons, the Juan de Fuca and Quinault canyons, running perpendicular to the shore (Strickland and Chasan 1989). These habitats are dynamic, highly productive, and complex ecosystems. Submarine canyons facilitate locally increased upwelling, high nutrient availability, and vigorous productivity (Freeland and Denman 1982; Hickey *in press*). Submarine canyons are also sites of accumulation for organic debris from drift macroalgae, surfgrass, and plankton detritus produced in surface waters. The complex habitat structure of submarine canyons (such as vertical cliffs, ledges, talus, cobble and boulder fields, and soft sediments) also provides cover for numerous fish and invertebrate species.

Dynamic Processes and Variability

Nearshore community structure and species composition in rocky tidal and beach habitats are principally determined by the frequency and magnitude of physical disturbances (Sebens 1987), intense intra- and inter-specific competition and predation (Connell 1978; Paine 1969; Robles and Desharnias 2002), and highly variable recruitment dynamics (Gaines and Roughgarden 1985; Menge and Sutherland 1987; Roughgarden et al. 1988). These nearshore habitats and the organisms that inhabit them are subjected to nearly constant and intense physical agitation and disturbance (Proctor et al. 1980; Airamé et al. 2003) from wind, waves, tides, temperature, desiccation, sediments, and sand scouring. Despite some protection from offshore islands, submarine ridges, projecting headlands, and large offshore kelp beds, the coast of the project area is subject to strong wave action even in calm weather.

Soft substrata habitats of the coastal benthos are structured by depth gradients in temperature, disturbance by storms and wave action, and movement and accumulation of sediments (Maragos 2000). Submarine canyons that indent the Washington coastal shelf, such as the Juan de Fuca and Quinault canyons in the project area, facilitate locally increased upwelling and nutrient availability in nearshore areas (Freeland and Denman 1982; Hickey *in press*). Turbidity currents associated with submarine canyons represent episodic disturbance events that serve as major conduits for sediment transport to the deep sea. These turbidity currents erode canyon walls, transport loose sediments and detrital material, and represent significant disturbance events structuring infaunal communities associated with submarine canyons (Vetter and Dayton 1998; Vetter and Dayton 1999).

3.3.3.2.2 <u>Biological Resources</u>

Marine Algae, Marine Plants, and Associated Biota

Surfgrass (*Phyllospadix* spp., and associated macroalgae) and kelp (bull kelp *Nereocystis* sp., giant kelp *Macrocystis* sp., and other brown algae) communities are associated with the rocky nearshore habitats. Surfgrass (*Phyllospadix* spp.) is an aquatic plant species present in rocky subtidal and intertidal habitats with high wave exposure. Surfgrass occurs from the intertidal zone to 23 feet deep (Ramírez-García et al. 2002), exhibits very high rates of production (Proctor et al. 1980), and hosts a diverse community of invertebrates and fishes. Kelp communities are found 6 to 200 feet deep (Rodriguez et al. 2001) and can persist in areas subject to severe wave action and tidal currents. The overlying canopies, understory, turf, and corraline algae layers of kelp forests provide essential refuge, forage, and nursery habitats for associated algal, invertebrate, and fish communities (Proctor et al. 1980; Rodriguez et al. 2001). Kelp forests also provide an important food resource for inhabitants of soft and rocky benthic habitats, submarine canyons, deep channel basins, sandy and gravel beaches, rocky shores, and coastal lagoons (Airamé et al. 2003). Several marine mammal species, including sea otters and gray whales, forage and find refuge from predators in kelp forests (Cummings and Thompson 1971; Deysher et al. 2002; Nerini 1984). Kelp forests exhibit extremely high rates of primary production, growing up to 4 inches per day. Temperature, light, sedimentation, substrate, relief, wave exposure, nutrients, salinity, and biological factors (i.e., grazing, competition with other species) determine the distribution and abundance of kelp (Graham 1997). The highest densities are found on moderately low relief rocky substrata with moderate to low sand coverage (Deysher et al. 2002), while areas with very low relief and abundant sand are less favorable to persistent stands of kelp (Foster and Schiel 1985; Graham 1997). In addition to the primary habitat that kelp forests provide, they also provide secondary habitat for juvenile fishes, invertebrates, and seabirds in the form of drifting rafts of detached kelp.

Infaunal, Benthic, and Epibenthic Organisms

Rocky benthic subtidal habitats support extensive communities of benthic marine algae and invertebrates, as well as demersal invertebrates (e.g., mysiids and euphausiids) living in close association with the sea floor (see previous description of marine algae ecosystems). Sessile benthic invertebrates in these habitats are subject to less severe physical agitation and disturbance than in rocky intertidal habitats. As with intertidal communities, however, intense intra- and inter-specific competition and predation, along with highly variable recruitment dynamics, are principal forces in structuring the abundance, composition, and variability of these communities.

Soft-bottom subtidal habitats also support a rich diversity of infaunal invertebrates, including amphipod crustaceans, echinoderms, and polychaete worms, as well as highly motile epibenthic invertebrate species (such as dungeness crab). Benthic infauna are organisms that live in the sediments by attaching to the soft substratum, dwelling in tubes, or burrowing through the sediments. Infaunal communities are often used as baselines for ecological assessments because they tend to exhibit more stable species composition and population dynamics than more mobile epifaunal assemblages such as crabs or bottom fish. This apparent stability is, however, subjected to considerable physical disturbance and variability and should not be interpreted to reflect a static environment. Soft-bottom benthic habitats along the Washington coast, including the project area, are productive biological environments influenced by a variety of complex physical processes (Braun 2005). The major short-term processes that affect infaunal communities include tidal-, wind-, and wave-induced turbulence, currents, sedimentation from the Columbia River plume and local rivers, storms, and variability in food availability associated with upwelling and plankton blooms. The infauna that inhabit this environment are adapted to these high-energy environments with high sediment deposition, erosion, and sediment transport. Large storms with large waves, large freshwater outputs from the Columbia River and other rivers, and semi-diurnal tides act to suspend sediments and organic particulates. The organisms that inhabit these constantly shifting substrata tend to be highly motile rapid burrowers, rapid tube builders, or rapid colonizers with regular recruitment. Seasonal and interannual variability in the species composition and abundance of infaunal communities off the Washington coast is considerable, particularly at inshore locations influenced by sediment movement due to winter storms and river outfalls (Richardson et al. 1977). In summary, benthic soft-bottom habitats are subject to frequent high-intensity disturbances and are inhabited by infaunal communities of opportunistic colonizers exhibiting strong seasonal variability and spatial patchiness (Richardson et al. 1977; Oliver et al. 1980; Hancock 1997).

For a general description of gray whale feeding on benthic prey, see Section 3.4.3.1.3, Feeding Ecology and Role in the Marine Ecosystem. For a description of gray whale benthic feeding in the northern portion of the summer range, see Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, Northern Portion of the Summer Range. For a description about gray whale benthic feeding occurring in the project area, see Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, Southern Portion of the Summer Range.

Groundfish

Benthic habitats along the continental shelf support a large biomass of demersal (bottom-dwelling) groundfishes (Dark and Wilkins 1994). Adult groundfish species (e.g., rockfish, *Sebastes spp*.; sablefish, *Anoplopoma fimbria*; Pacific hake/whiting, *Merluccius productus;* spotted ratfish, *Hydrolagus colliei*; and spiny dogfish, *Squalus acanthius*) typically are associated with hard substrata of offshore reefs, banks, and submarine canyons. As with pelagic species, physical oceanographic processes such as currents, upwelling, the Columbia River plume, fronts, and eddy features influence the distribution and abundance of groundfish species (Doyle 1992; Dower and Perry 2001; Nasby-Lucas et al. 2002; Williams and Ralston 2002; Bosley et al. 2004; Emmett et al. 2004; Emmett et al. 2006). The groundfish community in the Pacific Northwest also exhibits a strong depth gradient in species composition and diversity (Tolimieri and Levin 2006). Many groundfish species produce pelagic larval and juvenile life stages, which generally float or swim near the sea surface and may be associated with floating debris such as kelp rafts. Pelagic larval and juvenile life stages are widely dispersed by storms, upwelling events and ocean currents and have limited associations with specific nearshore or benthic habitats (NOAA 1993). Older life stages, however, exhibit stronger habitat associations based on specific zones, depths, or substrate characteristics. Other groundfish species may exhibit seasonal migrations, resulting in an annual variation in habitat preferences (NMFS 2005a). The distribution, abundance, and recruitment of groundfish species is also strongly affected by climatic/oceanographic variability such as El Niño events. During periods of El Niño there is an overall northward shift of tropical and temperate species (Cross 1987; Cross and Allen 1993). Rockfish are particularly sensitive to El Niño, demonstrating a decline in overall biomass as a result of recruitment failure and reduced growth of adults as poor overall condition in the region becomes evident (Lenarz et al. 1995; Moser et al. 2000).

With respect to conservation status, nine West Coast groundfish species occurring in the project area are designated as overfished under the Magnuson-Stevens Act (NMFS 2005a) (an overfished species is defined as a population below 25 percent of its natural [unfished] population size). These species are darkblotched rockfish (*Sebastes crameri*), bocaccio (*S. paucispinis*), cowcod (*S. levis*), widow rockfish (*S. entomelas*), canary rockfish (*S. pinniger*), yelloweye rockfish (*S.*

ruberrimus), Pacific Ocean perch (*S. alutus*), lingcod (*Ophiodon elongatus*) and Pacific hake/whiting (NMFS 2005a). Lingcod has been rebuilt to above 40 percent of its unfished level (NMFS 2005a). The Pacific Fishery Management Council and NMFS have established the Yelloweye Rockfish Conservation Area in the project area to limit the incidental catch of this overfished species. The following groundfish species are designated as emphasis species (species in need of ongoing conservation efforts and noted for their importance to commercial and recreational fisheries): sablefish, Dover sole (*Microstomus pacificus*), English sole (*Paraphrys vetulus*), Petrale sole (*Eopsetta jordani*), arrowtooth flounder (*Atheresthes stomias*), chilipepper rockfish (*S. goodei*), yellowtail rockfish (*S. flavidus*), black rockfish (*S. melanops*), longspine thornyhead (*Sebastolobus altivelis*), shortspine thornyhead (*S. alascanus*), and cabezon (*Scorpaenichthys marmoratus*) (NMFS 2005a). NMFS also recently listed North American green sturgeon (*Acipenser medirostris*) spawned in the Sacramento River (California) as threatened under the ESA (71 FR 17757, April 7, 2006). Although there are limited data concerning the marine distribution of this species, it too, may occur in the project area.

Essential fish habitat has been designated by the Pacific Fishery Management Council and NMFS for groundfish in the project area. A comprehensive description of essential fish habitat off the coast of Washington is available in the Final Groundfish Essential Fish Habitat EIS (NMFS 2005a). In addition to designating essential fish habitat for groundfish, NMFS also recently identified habitat areas of particular concern. Habitat areas of particular concern include seagrass, canopy kelp, rocky reef, and estuaries along the Pacific coast, including the project area (NOAA 2006).

3.4 Eastern North Pacific Gray Whale

3.4.1 Introduction

Any Makah whale hunt would target ENP gray whales. The status, population structure, distribution, and habitat use of the gray whale are relevant when analyzing the effects of any hunt on the population and on whales that migrate through or stop to feed in the waters off the Washington coast. It is also important to establish information to analyze and understand how an individual gray whale may be affected by a hunt.

3.4.2 Regulatory Overview

The regulatory information presented for the MMPA and WCA in Chapter 1, Section 1.2, Legal Framework, describes the statutory and regulatory processes that apply to the Makah's proposal.

The regulatory information in this section describes substantive requirements of the MMPA and WCA, and as well as their implementing regulations.

3.4.2.1 Marine Mammal Protection Act Management

NMFS has jurisdiction over cetaceans and most other marine mammals (e.g., walruses and sea otters are under the jurisdiction of the FWS) under the MMPA, the primary federal law governing marine mammal conservation and protection in the United States (Section 1.2.3, Marine Mammal Protection Act, for more details about the Act). Because an understanding of NMFS' management scheme for marine mammal populations is key to understanding the agency's management of ENP gray whales, some basic principles of marine mammal management are described below. More information about NMFS' management of marine mammal stocks in general is available in the annual stock assessment reports submitted to Congress, found online at http://www.nmfs.noaa.gov/pr/sars/.

3.4.2.1.1 Defining Marine Mammal Population Parameters

Optimum Sustainable Population — OSP

NMFS (and the FWS for walrus, polar bears, sea otters, and manatees) receives general management direction from Congress through Section 2 of the MMPA. Congress has specified that the primary objective of marine mammal management under the MMPA is to maintain the health and stability of the marine ecosystem and has directed agencies to manage, whenever consistent with this primary objective, in a manner to obtain an optimum sustainable population (OSP) of marine mammal stocks (16 USC 1361(6)). OSP was adapted from the concept of maximum sustained yield used in fisheries management and large whale harvest management in the IWC arena. OSP, rather than maximum sustained yield, is the model used in domestic marine mammal management to reflect the shift in conservation philosophy introduced by the MMPA to ensure that the value of marine mammals should not be measured by economic criteria alone. Congress noted, for instance, that "marine mammals have proven themselves to be resources of great international significance, esthetic and recreational as well as economic" (16 USC 1361(6)).

The OSP is defined statutorily as "the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem in which they form a constituent element" (16 USC 1362(9)). NMFS has further defined OSP in agency implementing regulations as "a population size which falls within a range from the population level of a given species or stock which is the largest supportable within the ecosystem [known in biological terms as carrying capacity, abbreviated as K] to the population level that results in maximum net productivity level [MNPL]" (50 CFR 216.3). NMFS manages impacts to marine mammal populations according to congressional directives with the goal of maintaining the number of animals within OSP (between K and MNPL). To understand the operating theory of OSP, it is important to understand the biological implications of K and MNPL, the endpoints of the OSP range.

Carrying Capacity - K

K (the upper limit of OSP) can generally be understood as the population level that can be supported in the ecosystem as determined by the key constituent elements, such as food, habitat, temperature, ice cover, etc. As population density increases, birth rates often decrease, and death rates typically increase. K is the point at which these two rates are equal. It is, thus, the number of individuals an environment can support without significant negative impacts and is the largest size of a density-dependent population at which the population maintains equilibrium (population size neither increases nor decreases). For a particular environment, K will vary by species and can change over time due to a variety of factors, including food availability, disease, competition, predation, environmental conditions, and space. It is possible for a species to exceed its K temporarily.

Maximum Net Productivity Level — MNPL

MNPL (the lower limit of OSP) is a population level related to maximum net productivity, a rate of change defined in NMFS regulations as "the greatest net annual increment in population numbers or biomass resulting from additions to the population due to reproduction and/or growth less losses due to natural mortality" (50 CFR 216.3). In practical terms, MNPL is the population level (i.e., number of animals) that will yield the maximum recruitment into a marine mammal population (i.e., births minus deaths). Sometimes MNPL is expressed as a fraction of K.

3.4.2.1.2 Calculating Marine Mammal Population Parameters

Although the OSP concept is understandable from a theoretical or conceptual perspective, it has been difficult to quantify K and MNPL for some species or stocks of marine mammals (Ragen 1995). Although analytical techniques exist (e.g., dynamic response analysis [Goodman 1988]) that allow an assessment of whether a population is within its OSP without the need to estimate K or MNPL, such methods have not been used successfully in a management context and are not addressed further.

NMFS has been able to determine OSP for some species either by measuring pre-exploitation abundance (e.g., Cook Inlet beluga) or by back-calculating pre-exploitation abundance (e.g., eastern tropical Pacific dolphins) and treating it as K (carrying capacity) for the upper limit of OSP. In a logistic model of population growth, MNPL (the lower limit of OSP) is 50 percent of K, but it is generally accepted that because marine mammals are long-lived with slow rates of reproduction, they have MNPL closer to K (Eberhardt and Siniff 1977). In the absence of direct measurements of MNPL, NMFS has chosen the model-derived value of 60 percent of K (45 FR 72178, October 31, 1980). NMFS has also been able to assess OSP for other species such as harbor seals (Jeffries et al. 2003; Brown et al. 2005) by monitoring abundance of the population as it recovers from exploitation to an equilibrium level. By fitting logistic growth models to the abundance estimates through time, both MNPL and K can be measured for the population (Wade and Perryman 2002; Brown et al. 2005).

3.4.2.1.3 Linking Marine Mammal Population Parameters to Removals

To help the agency determine whether particular take levels would maintain the level of any given stock at OSP or not impede the stock's recovery to OSP, NMFS developed a management tool referred to as the potential biological removal (PBR) approach. In 1992, NMFS submitted a legislative proposal to Congress outlining the PBR approach for determining how many individuals could be removed from a population stock of marine mammals while allowing the stock to recover to, or be maintained within, its OSP (NMFS 1992).[1]

3.4.2.1.4 Defining and Calculating PBR

In 1994, Congress amended the MMPA to incorporate a regime to govern the taking of marine mammals incidental to commercial fishing operations (Section 118); many aspects of this

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[1] To reduce confusion, it is worth clarifying that NMFS and the IWC use different methods for calculating allowable removals from marine mammal populations. NMFS operates under the protection and conservation purposes and policies of the MMPA by applying the PBR approach to the MMPA's OSP model, as described above. The IWC operates under the ICRW, which historically had a harvest focus. Therefore, the IWC calculates allowable removals or catch limits by focusing on sustainable yield under the maximum sustainable yield model. As described in Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling, the IWC acts on the advice of the Scientific Committee to set catch limits for large cetacean stocks based on the maximum sustainable yield model. The Scientific Committee advises the IWC on a minimum stock level for each stock, below which whales are not taken, and on a rate of increase towards the maximum sustainable yield level for each stock (footnote to IWC Schedule, Paragraph 13(a)(2)). The ENP gray whale stock is at or above maximum sustainable yield level, so aboriginal subsistence catches are allowed as long as they do not exceed 90 percent of that maximum sustained yield (Paragraph 13(a)(1)).

provision of the statute were based on the legislative proposal NMFS prepared and submitted to Congress in 1992 (NMFS 1992). The concept of PBR was among the aspects of NMFS' proposal included in the 1994 MMPA amendments. Under 16 USC 1362(20), PBR level is defined as the "maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population."

The MMPA (16 USC 1362(20) also prescribes a formula for calculating PBR, which is the product of three factors:

$$PBR = N_{min} * 0.5R_{max} * F_r$$

- N_{min} is the minimum population estimate of the stock.
- $0.5R_{max}$ is one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size.
- F_r is a recovery factor of between 0.1 and 1.0.

As long as the total number of animals removed from the population due to human sources is no more than the calculated PBR of an affected stock of marine mammals, then such taking (by removal) will not prohibit the stock from recovering to or being maintained within its OSP.

3.4.2.1.5 Implementation of PBR Approach

Before its initial implementation of the PBR approach (Barlow et al. 1995), NMFS selected default values for the parameters of the PBR formula that would meet specific performance criteria and ran simulations to test the efficacy of maintaining OSP or allowing recovery to OSP. In these performance trials, numerous individuals from a hypothetical marine mammal stock were removed from the population at levels up to the calculated PBR each year. One of the following two conditions was satisfied for at least 95 percent of simulation trials: (1) populations at the MNPL (i.e., the low end of the OSP range) would remain at that level or above it after 20 years; and (2) populations below OSP (i.e., depleted populations at 30 percent of K) would recover to OSP within 100 years. In their conclusions, Barlow et al. (1995) noted that the PBR approach, as recommended and tested, would satisfy the objectives of the MMPA and would facilitate the Section 2 mandate to develop marine mammal stocks to the greatest extent feasible. In other words, for marine mammal stocks at OSP, the PBR approach would not cause them to fall below OSP, and for marine mammal stocks below OSP, the PBR approach would not prevent them from achieving OSP. Wade (1998) reported on more extensive simulation trials related to the implementation of NMFS' PBR approach and confirmed the major conclusions related to the performance of PBR that were included in Barlow et al. (1995).

Wade and Angliss (1997) discussed the review of, and recommendations for, minor revisions to NMFS' initial PBR approach. This report, which summarized the results of a NMFS-convened workshop, indicated that the initial guidelines were adequate in most areas. Workshop participants recommended some minor revisions to the use of abundance estimates in calculating PBR. The most notable recommendation is that PBR levels should be reported as unknown when the supporting abundance estimate for the affected marine mammal stock is at least 8 years old, unless there is compelling evidence that the stock has not declined since the last abundance estimate. NMFS adopted and implemented this recommendation. In 2003, NMFS reviewed its PBR guidelines again and, after public review and comment, made no substantive changes to PBR calculations when the final guidelines were completed in 2005 (70 FR 35397, June 20, 2005).

3.4.2.1.6 Take Permits

Under Section 104(a) (16 USC 1374(a)) NMFS may issue permits for the taking or importation of a marine mammal. The permit must be consistent with applicable regulations and must specify the number of animals authorized to be taken; the location and manner (which NMFS must determine to be humane) in which they may be taken; the period during which the permit is valid; and other terms or conditions the agency deems appropriate (16 USC 1374(b)). If the agency waives the take moratorium, it is to issue regulations deemed necessary and appropriate "to insure such taking will not be to the disadvantage of those species and population stocks and will be consistent with the purposes and policies" of the MMPA (16 USC 1373(a)). The statute identifies certain factors the agency must consider fully in prescribing regulations governing the taking, including the effect of the regulation on existing and future levels of marine mammal species and population stocks; existing international treaty and agreement obligations of the United States; the marine ecosystem and related environmental considerations; the conservation, development, and utilization of fishery resources; and the economic and technological feasibility of implementation (16 USC 1373(b)).

3.4.2.2 Whaling Convention Act

3.4.2.2.1 Whaling License

Under the WCA (16 USC 916d) and NMFS regulations (50 CFR 230.3(b)), no person may engage in whaling without a license. NMFS by regulation has issued a license "to whaling captains identified by the relevant Native American whaling organization" (50 CFR 230.5(a)). NMFS may suspend the license of any captain who fails to comply with NMFS' regulations. NMFS' regulations further specify that any aboriginal subsistence whaling quota shall be allocated to each whaling village or captain by the appropriate Native American whaling organization. At least annually, NMFS is to publish aboriginal subsistence whaling quotas and any restrictions on subsistence whaling in the Federal Register. When NMFS published aboriginal subsistence whaling quotas for the use of the Makah Tribe in the past, it executed agreements with the Makah Tribal Council that described the way NMFS recognized the Tribe as a Native American whaling organization (see, for example, 63 FR 16701, April 6, 1998).

3.4.2.2.2 Equipment, Crew, Supplies, and Training

WCA Section 916d(d) requires an applicant for a whaling license to furnish evidence or an affidavit that the whaling vessel is adequately equipped and competently manned to engage in whaling in accordance with the provisions of the ICRW, the regulations of the IWC and NMFS' regulations. NMFS' regulations regarding aboriginal subsistence whaling prohibit whaling without adequate crew, supplies, or equipment (50 CFR 230.4(d)). In the past, when NMFS published aboriginal subsistence whaling quotas for the use of the Makah Tribe, it executed agreements with the Makah Tribal Council that specified the details regarding the supplies, equipment, crew, and training.

3.4.2.2.3 Wasteful Manner Restrictions

WCA regulations prohibit whaling captains from engaging in whaling in a wasteful manner (50 CFR 230.4(k)). Wasteful manner means "a method of whaling that is not likely to result in the landing of a struck whale or that does not include all reasonable efforts to retrieve the whale" (50 CFR 230.2). Related to reasonable efforts to retrieve any whale, WCA regulations also require whaling captains to use harpoons, lances, or explosive darts that bear a permanent distinctive mark identifying the whaling captain (50 CFR 230.4(j)). The mark allows struck and lost whales that wash ashore, or are found later, to be identified and reported as struck and lost whales. WCA regulations also prohibit whaling for any calf or parent accompanied by a calf (50 CFR 230.4(c)).

3.4.2.2.4 Recording and Reporting

WCA regulations require the Native American whaling organization to monitor the hunt, keep a tally of the number of whales struck and landed, and close the season when the quota is reached (50 CFR 230.7(b)). Whaling captains must provide oral or written reports on whaling activities to the Native American whaling organization, including, but not limited to, striking, attempted striking, or landing of a whale, and (where possible) specimens from a landed whale (50 CFR 230.8(b)). The report is to include information on the number, dates, and locations of each strike, attempted strike, or landing; the length and sex of the whale landed; and an explanation of the circumstances involving any whale struck and not landed. NMFS is also authorized to provide technical assistance to facilitate prompt reporting and collection of specimens from landed whales, including, but not limited to, ovaries, ear plugs, and baleen plates (50 CFR 230.8(b)). Following the 1999 and 2000 hunts, the NMFS observers to the hunt provided their own reports to NMFS (Gosho 1999; Gearin and Gosho 2000). The Makah Tribe and NMFS also published a joint report for the 1999 hunt.

3.4.3 Existing Conditions

3.4.3.1 General Life History and Biology

3.4.3.1.1 Identifying Physical Characteristics

Adult gray whales are 36 to 50 feet long and weigh between 16 and 45 tons; females are larger than males. They have two to five deep longitudinal creases on their throats, and their heads appear narrowly triangular when viewed from above; there is no head ridge (Leatherwood et al. 1988). Ventral blubber can be 3 inches (7 cm) thick (Gulland et al. 2005). Migrating gray whales breathe at regular intervals, generally blowing three to five times at intervals of 30 to 50 seconds, then lifting their flukes and submerging for 3 to 5 minutes (Leatherwood et al. 1988). Gray whales make shallow dives of 50 to 165 feet, but they may dive as deep as 390 feet to feed.

3.4.3.1.2 Global Distribution and Population Structure and Status

Historically, gray whales occurred in both the North Pacific and North Atlantic Oceans (Fraser 1970; Mead and Mitchell 1984), but are currently found only in the North Pacific Ocean (Rice et al. 1984). At one time, the whales may have accessed both the Pacific and Atlantic Oceans by swimming through migratory corridors in the Arctic (Gilmore 1978), but the distribution of the species probably changed due to periodic closures of the Bering Sea during ice ages (Swartz et al. 2006). Glaciation dropped sea levels and exposed underlying continental shelf regions, including the Bering Isthmus, which effectively blocked access to the Arctic (Berta and Sumich 1999). Gray whales disappeared in the North Atlantic by the end of the seventeenth century (Mead and Mitchell 1984).

Management authorities, including the International Whaling Commission (IWC) and NMFS, have identified two management units for this species based on the best scientific information available: a western North Pacific population and an eastern North Pacific population (Rugh et al. 1999; Swartz et al. 2006). The two populations are recognized as separate under the World Conservation Union (IUCN) International Convention for the Conservation of Nature and Natural Resources (Baillie et al. 2004; Swartz et al. 2006). The western North Pacific gray whale population (also known as the Korean or Korean-Okhotsk population) migrates annually along the east coast of Asia. The eastern North Pacific (ENP) gray whale population (also known as the California-Chukchi population) migrates annually along the west coast of North America, generally between a summer range as far north as the Bering, Chukchi, and Beaufort Seas and a winter range as far south as the Baja Peninsula in northwestern Mexico (Rice et al. 1984; Swartz et al. 2006) (Figure 3-3). Available data indicate that management at this population level is appropriate for three reasons:

1. **Geographic Separation** – the North Pacific populations of gray whales are geographically separated. They occupy different coastal migratory corridors and feeding and breeding areas, with an apparent gap in distribution along the eastern shore of the Kamchatka Peninsula between the Okhotsk and Bering Seas (IWC 1993; Swartz et al. 2006);

2. **Genetic Differentiation** — the North Pacific populations of gray whales are significantly genetically distinct, based on analysis of mitochondrial deoxyribonucleic acid (mtDNA, as inherited through the mother's lineage) (LeDuc et al. 2002; Lang et al. 2004);

3. **Demographic Independence** — the North Pacific populations of gray whales have exhibited different rates of recovery and levels of abundance following overexploitation due to commercial harvest (Rugh et al. 1999; Swartz et al. 2000; Swartz et al. 2006).

The western North Pacific population was listed as critically endangered by the IUCN in 2000 (Hilton-Taylor 2000; Baillie et al. 2004) and remains critically depleted. It is estimated to contain 100 or fewer whales (Wade et al. 2003; Weller et al. 2005). By contrast, the ENP population is thought to have recovered to pre-exploitation numbers, and NMFS removed it from the endangered species list in 1994 (59 FR 21094, June 16, 1994) after three decades of research supported the conclusion that it had recovered (Buckland and Breiwick 2002). Recently, Alter et al. (2007) used a genetic approach to estimate prewhaling abundance of gray whales and reported DNA variability indicative of an ENP gray whale population of approximately two to four times more numerous than today's average census size (the ENP gray whale population was last estimated to be 20,110 whales (Rugh et al. 2008)). Alter et al. (2007) note that their estimate likely measures both the eastern and western gray whale stocks together, and that an important question is whether carrying capacity has declined over time. If it has, then gray whales may be reduced from historical numbers but may have reached a new, lower carrying capacity today.

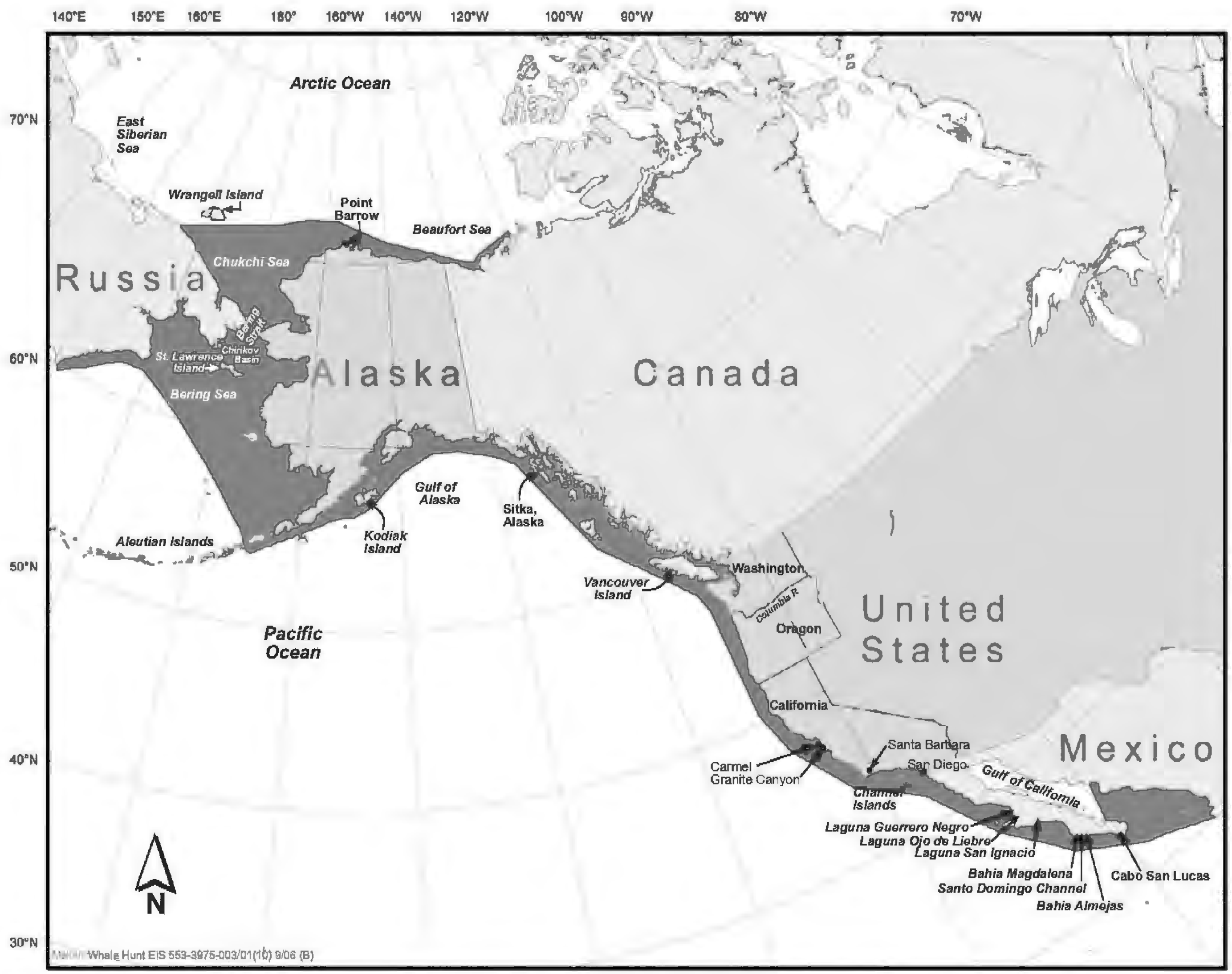


Figure 3-3. Approximate Rangewide Distribution of the ENP Gray Whale Population

The lower range of the confidence interval reported in Alter et al. (2007) is consistent with a historic abundance of about 30,000 whales each for the western and eastern North Pacific stocks of gray whales. An abundance of 30,000 gray whales in the Eastern North Pacific stock is within the confidence limits for estimates of carrying capacity reported by Wade (2002). Some scientists (e.g., Palsboll et al. 2008) have questioned the results and conclusions of Alter et al. (2007). NMFS intends to address the findings of Alter et al. (2007) and other researchers as part of the next update of the stock assessment report for the ENP gray whale stock.

For the remainder of this chapter, all references to the gray whale will be to the ENP population only.

3.4.3.1.3 Feeding Ecology and Role in the Marine Ecosystem

Gray whales use various feeding techniques, including (1) suction feeding, also called benthic feeding or bottom feeding, which allows them to feed on crustaceans that live burrowed in (infauna) and just above (epifauna) the sea floor; and (2) engulfing or skimming prey in the water column and on the sea surface. This broad foraging capability allows gray whales to feed on a wide variety of prey throughout their range (Nerini 1984; Darling et al. 1998; Dunham and Duffus 2001; Moore et al. 2003; Moore et al. 2007). This capability may account for the gray whale's more rapid recovery from commercial whaling when compared with other large whale species (Nerini 1984; Moore et al. 2001).

Gray whales regularly consume benthic prey (Nemoto 1970; Nerini 1984), often creating furrows or pits (Johnson and Nelson 1984; Kvitek and Oliver 1986). Gray whales display an adaptation to bottom feeding because their baleen plates are thicker and the hairs are coarser sturdy than those of other whales. This allows them to excavate coarse bottom sediments on a regular basis (Nemoto 1959; Nerini 1984). Nerini (1984) listed prey of more than 19 genera from gray whale stomachs, including a wide variety of benthic and epibenthic invertebrates, such as amphipods, decapods, molluscs, polychaete worms, and sponges. Moore et al. (2007) also recently documented tens to hundreds of gray whales feeding off Kodiak Island, primarily on epibenthic marine crustaceans commonly referred to as hooded shrimp.

Excavation of bottom sediments by feeding gray whales may play a role in maintaining the benthic habitat in some areas, though its relative importance is not clear. Some investigators hypothesize that gray whale benthic feeding may help maintain the substrate (Johnson and Nelson 1984; Oliver and Slattery 1985), or otherwise have an important influence on the benthic community (Nelson and Johnson 1987; Grebmeier et al. 1989). Excavated sites also trap woody debris, which affects benthic productivity (Oliver and Slattery 1985). Gray whale excavation has been proposed as a major source of disturbance and part of a cycle of exploitation, recolonization, succession, and maturing of the prey community (Nerini 1984; Oliver et al. 1984; Oliver and Slattery 1985). Conversely, some investigators have proposed that the growing gray whale population has reached carrying capacity and that the population's overexploitation of benthic amphipods in the Bering Sea may have led to a decrease in amphipod abundance during a documented period from 1986 to 1988 (Highsmith and Coyle 1992). It has further been suggested that gray whale foraging can lead to permanent localized loss of amphipod or other prey communities, forcing whales to forage elsewhere (Highsmith and Coyle 1992; Weitkamp et al. 1992). In the project area, gray whales may be feeding on both pelagic and benthic prey. It appears that benthic communities in the project area are influenced primarily by large-scale oceanographic and climatic processes (Section 3.3.3.2.1, Physical Features and Processes).

Gray whales excavating the benthos may also make food available for surface-feeding seabirds. As the whales stir up the benthos, particularly in shallow waters, feed rises to the surface. Observations in the Bering Sea suggested this association (e.g., Grebmeier and Harrison 1992), but no similar studies have been conducted in the project area. When gray whales die, decomposing whale carcasses also deliver large pulses of organic material to the seafloor. This material may serve as islands of habitat for unique assemblages of deep-sea macrofauna (Dahlgren et al. 2004; Goffredi et al. 2004).

Although gray whales are consistently characterized as benthic feeders in the literature, they also feed on pelagic prey, including mysid crustaceans, crab larvae, herring eggs and larvae, ghost shrimp, and eupahusiids (Murison et al. 1984; Nerini 1984; Oliver et al. 1984; Weitkamp et al. 1992; Duffus 1996; Darling et al. 1998; Benson et al. 2002; Dunham and Duffus 2002; Bluhm et al. *in revision*). They feed in the water column by making short dives and random movements in kelp beds and within the surf zone of rock and islets (Murison et al. 1984; Nerini 1984; Darling 1998). When they skim feed on the sea surface, they move along the surface, biting down on plankton streams along the tide line (Darling 1998).

Over the years, researchers have observed gray whales aggregating in particular areas to feed where prey densities are high, especially in areas of benthic prey densities in the northern seas (e.g., Berzin 1984; Yablokov and Bogoslovskaya 1984; Clarke and Moore 2002; Moore et al. 2000; Moore et al. 2003; Highsmith et al. 2007). The term 'feeding aggregation' has been used in scientific literature to describe these concentrations of feeding whales (e.g., Berzin

1984; Calambokidis et al. 2002). Areas where whales congregate to feed on a regular basis have been referred to as 'feeding grounds' or 'feeding areas' (e.g., Berzin 1984; Calambokidis et al. 2002; Moore et al. 2003; Calambokidis et al. 2004a), though the whales also feed continuously along their migration route. Some scientists have proposed that whales primarily feed on benthic prey in higher latitudes and switch to pelagic prey in lower latitudes (Nerini 1984), or that prey are in primary, secondary, or tertiary feeding grounds with pelagic prey occurring further south in the range (Kim and Oliver 1989). Others have proposed that whales select pelagic prey first when available because it is easier to obtain than benthic prey (Dunham and Duffus 2001). Dunham and Duffus (2001) hypothesize that pelagic prey disperses in the water column, making a relatively easy filter-feeding target, and that the distribution of pelagic prey is not as patchy or unpredictable as benthic prey. Rather than exhibiting strong regional or prey-type preferences, whales probably exhibit highly plastic and opportunistic foraging behavior using a variety of prey resources, both benthic and pelagic, within a given feeding area (Darling et al. 1998). After 26 years of observations off the southwest coast of Vancouver Island, some researchers noted that whales could be observed feeding in discrete pockets of habitat over short time frames, depending on prey availability. Over longer time frames, however, virtually all of the southwest coast study area was used by feeding gray whales (Darling et al. 1998; Dunham and Duffus 2001). Darling et al. (1998) proposed that gray whales are attuned to natural patterns of abundance and absence occurring within a prey assemblage and that different prey species play equal roles over a season or several years.

Because both feeding aggregations (the whales) and feeding areas (the prey) are dynamic, with both small- and large-scale changes over time and space, the following discussion examines the entire range in which gray whales feed. As described below in Section 3.4.3.3, Distribution and Habitat Use, gray whales change location and habitat to exploit the optimum prey species at any one time, based on abundance, density, size, caloric content, and predation pressure. Such factors may vary by season and year, depending on environmental variability and the population dynamics of prey (Darling et al. 1998; Clarke and Moore 2002; Moore et al. 2007).

3.4.3.1.4 Seasonal Migrations

Seasonally predictable sources of food broadly shaped gray whale life history into two major periods: summers, when whales feed in higher latitudes with abundant food and minimal sea ice, and winters, when whales migrate to lower latitudes to escape sea ice and inclement weather and to calve in warmer waters (Swartz 1986; Swartz et al. 2006). Long-distance migrations of gray whales thus evolved in the spring and the fall/winter, primarily as an evolutionary response to the seasonal production of prey species in the shallow waters of polar regions (Lipps and Mitchell 1976; Swartz et al. 2006).

Gray whales generally migrate seasonally along the coast of North America between a summer range as far north as the Chukchi and Beaufort Seas and a winter range as far south as the Baja California Peninsula and Gulf of California in northwestern Mexico (Rice et al. 1984; Urbán-Ramírez et al. 2003) (Figure 3-3). The general characteristics, timing, and migratory distance relative to shore for fall/winter southward and spring northward migrations are described more specifically below, while shorter- and longer-term aspects of distribution and habitat use are discussed later in Section 3.4.3.3, Distribution and Habitat Use.

Fall/Winter – Characteristics and Timing of the Southward Migration

The onset of the southward migration is difficult to define (Rugh et al. 2001) and is typically associated with the primary breeding period (Section 3.4.3.1.5, Reproductive Physiology and Calf Birth, Growth, and Development, for more detail about breeding activities). Timing may be influenced by several environmental variables, including the extent of ice coverage, availability of food resources, and photoperiod (Rugh et al. 2001; Clarke and Moore 2002; Swartz et al. 2006). It is also related to how widely the whales are distributed for foraging (Rugh et al. 2001). Most whales migrate out of northern seas sometime around mid-October to November, but some have been seen swimming south near Point Barrow as early as mid-August, and some have been seen along the Chukotkan Peninsula as late as mid-December (Rugh et al. 2001).The southward migration is generally grouped into two phases by age, sex, and reproductive status (Rice and Wolman 1971). The first migrant phase consists of near-term pregnant females, followed by non-pregnant females and mature males. The second migrant phase consists of immature whales of both sexes (Swartz et al. 2000; Swartz et al 2006). Poor weather conditions and widely scattered offshore distribution of gray whales make it difficult to survey whales migrating through the area (Green et al. 1995; Shelden et al. 2000; Rugh et al. 2001), but some studies are available. Shelden et al. (2000) reported observations of gray whales off the coast of Washington and in the Strait of Juan de Fuca near Port Angeles in early to mid-November. Observational studies also support the presence of southbound gray whales off the coast of Washington in December (Pike 1962; Darling 1984; Shelden et al. 2000). Using data from surveys at other locations, along with measured travel speeds of migrating gray whales, Rugh et al. (2001) calculated January 5 as the peak of the southward migration past Tatoosh Island.

The most routine observations of the gray whale migration have been in California (Rugh et al. 2001). Data from shore-based stations have shown a one-week shift in timing of median dates of southbound migrants (from January 8 to January 16) after 1980. This might have been due to an oceanographic regime shift in the northern portion of the summer range. The shift caused extreme ice retreats and may have expanded the distribution of gray whales on the feeding grounds and increased the distance of the southward migration (Miller et al. 1994; Hare and Mantua 2000; Rugh et al. 2001; Moore et al. 2003; Shelden et al. 2004; Moore 2005). Concurrent with these findings, southbound calf sightings have increased near San Diego (southern California) and Carmel (central California) since 1980; the one-week delay in the southward migration has meant that calving has occurred farther north than the Baja lagoons during the southward migration (Shelden et al. 2004). Gray whales generally reach their wintering grounds starting in late December or early January and reach maximum densities in February.

Spring – Characteristics and Timing of the Northward Migration

In mid-February, as the southward migration comes to an end in California and Mexico, the northward migration begins. This overlap suggests that not all of the gray whale population winters near the Baja California Peninsula. Some whales may only go as far south as the coastal waters of California before they turn around again to head north (Herzig and Mate 1984; Swartz 1986; Swartz et al. 2006). The northward migration to summer feeding areas occurs in two generally grouped phases according to age, sex, and reproductive condition (Poole 1984; Swartz 1986; Swartz et al. 2006). The first migrating phase consists of newly pregnant females, followed 2 weeks later by adult males and non-pregnant females, then by immature whales of both sexes another week later (Swartz et al. 2006). In mid and late February, as the first phase of the migration is underway, mothers with newborn calves move from interior lagoons to lagoon inlets and coastal waters previously occupied by the single whales (Swartz et al. 2006). These mother and calf pairs comprise the second migrating phase of whales and are the last to leave wintering areas, departing between late March and May and generally arriving in their summer feeding range from May to June (Swartz et al. 2000; Swartz et al. 2006).

Poole (1984) reported the first phase of northbound migrants off the coast of central California from early February to early April. Gilmore (1960) reported similar dates (mid-February, peaking in March and April, and tapering off in early May) past San Diego. Herzig and Mate (1984) reported the first phase of northbound migrants passing through the waters off Oregon in mid-February through April, peaking in mid-March. A study conducted at Unimak Pass, Alaska, reported a peak passage of northbound phase-one migrants in the last week of April, indicating an approximate lag of 4 to 5 weeks between Oregon and Alaska (Hessing 1981; Herzig and Mate 1984). The cow-calf migrants in the second migrating phase travel more slowly than the whales in the first migrating phase to accommodate nursing and calves (NMFS 2001a), and they have been reported to follow the first phase by 7 to 9 weeks (Herzig and Mate 1984). The predominantly cow-calf pair migrants in the second phase of the northward migration have been sighted passing through the waters off central California from early April to mid-May (Poole 1984) and passing by Oregon from late April to May, peaking in mid-May (Herzig and Mate 1984). Hessing (1981) observed cow and calf pairs passing Unimak Pass, Alaska, from May through mid-June, peaking on June 4. Taking both migration phases into account, northbound whales of all ages and both sexes are present off the Washington coast from late February through June. There are no direct observations that establish the timing of either phase of the northward gray whale migration through the project area, nor are there any published estimates based on observations from other areas (as Rugh et al. [2001] calculated for the southward migration). Given the available observational data, it is reasonable to estimate that migrants in the first phase of the northward migration would be in the project area from March through early May, and migrants in the second phase would be in the project area from roughly early May until June.

Migratory Distribution Relative to Shore (Location and Width of the Migratory Corridor)

The migratory distribution of gray whales relative to shore (i.e., location, width, and extent of the migratory corridor) varies based on environmental conditions (such as bottom topography, climate, and water depth), migration season and phase, and use of the migratory corridor (such as feeding, breeding, or migrating). Generally, gray whales migrate closer to shore where the continental shelf is narrow, such as near Granite Canyon, California, and distribute farther offshore where the continental shelf is broader, such as near the Channel Islands, California (Shelden 2007). There is also evidence that northbound whales travel closer to shore during spring than do southbound whales in fall and winter (Herzig and Mate 1984; Green et al. 1995).

Off the coast of Oregon, where the continental shelf is relatively narrow, Herzig and Mate (1984) systematically documented the offshore distribution of both northward and southward migrations, including both phases of migrants, from November to May, 1978 to 1981. They determined that more than 50 percent of all whales in the first phase of the southward and northward migration passed between 1 and 2 miles (1.6 km and 3.2 km) from shore, 131 to 197 feet (40 to 60 meters) deep. They also estimated that 90 percent of the second phase of northbound migrants, consisting predominantly of cow-calf pairs, passed less than 2,625 feet (800 m) from shore. Herzig and Mate (1984) noted that, as the northward migration progressed, pod size decreased and whales moved progressively closer to shore, traveling within 1 mile (1.6 km) from shore.

These nearshore patterns of migration for northbound whales are consistent with observations made off the coast of California from 1980 to 1982 (Poole 1984). Poole (1984) determined that the first phase of northbound migrants moved slightly farther offshore than the second phase; the first phase traveled within a straight-line corridor from one major point of land to another to avoid bights in the coastline, while the second phase (consisting of 90 percent cow-calf pairs) hugged the contours of the coastline. Sixty percent of the first phase of northbound migrants passed between 2 miles and 0.5 mile from shore (between 3.2 km and 800 m), 20 percent between 0.5 mile and 0.1 mile from shore (between 800 m and 200 m), and 13 percent within 0.1 mile (200 m) of shore. Ninety-nine percent of the second phase of northbound migrants passed within 0.1 mile of shore in 1980, and 96 percent passed within that distance in 1981. Poole (1984) and Braham (1984) noted potential biological advantages of nearshore migration, including the availability of productive food sources in shallow nearshore waters (such as eel grass meadows and swarms of mysid shrimp in kelp beds) and protective cover from predators provided by nearshore rocks, bottom topography, and kelp beds.

Off the coast of Washington, Pike (1962) used logbooks from the M/V *Pacific Ocean*, a fur seal research vessel operating during March to May of 1958 to 1960, to observe gray whale northward migrations. Pike (1962) reported that most whales probably passed within 1.2 miles (1.9 km) of the coast during the spring northward migrations, similar to the results of Herzig and Mate (1984) and Poole (1984). Pike (1962) also described northbound whales farther offshore. Logbooks from the Umatilla Lightship, stationed 5.2 miles (8.4 km) from shore south of Cape Flattery at Umatilla Reef, reported many gray whales passing close to the lightship from March to May. Whales engaged in various behaviors such as playing, mating, circling, rolling, or feeding, often remaining in the area for up to 4 hours. Pike (1962) also noted sightings 5.8 miles (9.3 km) off Cape Flattery, and a sighting of two adults and one calf as far as 23 miles (37 km) off Cape Flattery. These sightings farther offshore are consistent with Green et al. (1995), who documented phase-one northbound migrants off the coast of Washington from March 11 through 16, 1990, as far out as 12.4 miles (20 km), and averaging a distance of 7.3 miles (11.8 km).

For the fall/winter southward migration, Herzig and Mate (1984) reported the farthest extent of southbound migrants off the coast of Oregon as 12.4 miles from shore at less than 90 meters deep

(Herzig and Mate 1984). When Mate and Poff (1999) repeated the Oregon coast surveys of Herzig and Mate (1984) in 1999, they noted that whales were distributed farther offshore than described in the prior studies. Whereas Herzig and Mate (1984) had reported that 50 percent of both northbound and southbound migrants passed within 1 and 2 miles from shore, Mate and Poff (1999) estimated that 60 percent of the southbound whales were 5 miles or more offshore and 20 percent of the whales were within 3 miles of shore. These results are consistent with Green et al. (1995), who documented two groups of whales at 14.3 miles (23 km) as the furthest southbound migrants sighted off the coast of Oregon during aerial surveys conducted from January 3 to 12, 1990, and five groups of whales at 26.7 miles (43 km) as the furthest southbound migrants off the coast of Washington.

Green et al. (1995) noted a significant latitudinal variation between Oregon and Washington for offshore distances of both northbound phase-one and southbound migrations, with the variation more pronounced during the southward migration. They reported that southbound migrants averaged 15.7 miles (25.2 km) from shore off Washington and 7.4 miles (11.9 km) from shore off Oregon. Green et al. (1995) hypothesized that the difference between offshore distances for north and southbound whales either supports the occurrence of a single, very broad migratory corridor, or the occurrence of alternate offshore routes. Like Poole (1984) had noted for the California Bight area, Green et al. (1995) concluded that some portions of the ENP gray whale population may take a more direct route between Washington and the central coast of Vancouver, rather than following the longer coastal route past Cape Flattery. Shelden et al. (2000) neither confirmed nor rejected that hypothesis, but noted that distance offshore may not be a function of migration alone, since gray whales have been observed 31.1 miles (50 km) off the Vancouver Island coast and 28 to 56 miles (45 to 90 km) off the Washington coast during summer months when the whales are not migrating.

3.4.3.1.5 Reproductive Physiology and Calf Birth, Growth, and Development

Female gray whales become sexually mature and begin giving birth between five and 11 years of age (mean eight years; Rice and Wolman 1971). The sexual cycle in female gray whales lasts approximately two years and includes copulation, pregnancy, lactation, and a resting period after reproduction (Yablokov and Bugoslovskaya 1984). A calf is, therefore, produced every other year, a cycle that is tied to annual migrations and environmental conditions favorable for the early development of calves (Swartz 1986; Swartz et al. 2006). Both male and female gray whales are promiscuous breeders and copulate repeatedly with more than one mate (Jones and Swartz 1984).

Mating behavior is observed during most seasons (Gilmore 1960; Rice and Wolman 1971; Jones and Swartz 1984; Swartz 1986; Berta and Sumich 1999).

Female gray whales come into oestrus primarily during a three-week period from late November to early December, at the onset of, and during, the southward migration to wintering grounds from summer feeding areas (Rice and Wolman 1971; Shelden et al. 2004). At this time, whales congregate in nearshore areas of the summer feeding range at or near the top of the migratory corridor, possibly to find mates (Swartz et al. 2006). The mean conception date is approximately December 5 (Rice and Wolman 1971). Mating occurs throughout the southward migration in the migratory corridor. Females that have not successfully bred may enter a second oestrus cycle within 40 days (Rice and Wolman 1971), such that a few females may breed as late as the end of January while present on the winter grounds (Jones and Swartz 1984). Oestrus females and mature males in the second breeding cycle have been observed in Baja lagoons at highest densities near lagoon inlets and in adjacent coastal waters (Swartz et al. 2006). The gestation period lasts approximately 13.5 months (or approximately 418 days) (Rice et al. 1984), so newly pregnant females can calve about a year later.

Calves are born in the winter. Some gray whales calve in the shallow, protected Baja lagoons (often referred to in scientific literature as birthing lagoons, calving lagoons, or breeding lagoons), starting around December 26 and ending approximately at the beginning of March (Swartz and Jones 1983; Sánchez-Pacheco 1998), with a median birth date around January 27 (Rice and Wolman 1971). Since the late 1970s and early 1980s, calf sightings have increased near San Diego (southern California) and Carmel (Shelden et al. 2004). Scientists currently believe that perhaps one-quarter to one-half of the calves are born north of Carmel (well north of the Baja lagoons) during the southward migration (Shelden et al. 2004). Shelden et al. (2004) propose that some mothers that reach parturition along the southward migration may winter with their calves in the Southern California Bight, near the Channel Islands, until the calves are large enough to return north.

Calves are approximately 15 feet long and weigh 1,000 pounds at birth (Rice 1986). The sex ratio of calves is 1:1 for the ENP gray whale, but it is closer to 68 percent males and 32 percent for western Pacific gray whales (Rice and Wolman 1971; Jones and Swartz 1984; Weller et al. 2005). The mothers' rich milk is more than 50 percent fat and nourishes the calves for several weeks while they prepare for the long northward migration to summer feeding areas. Calves grow rapidly and stay with their mothers for 6 to 7 months; they are weaned in August and become independent while in the summer feeding areas (Rice and Wolman 1971; Swartz et al. 2006). Gray whale calves are approximately 28 to 30 feet long before migrating southward (Rice 1986).

3.4.3.1.6 Natural Mortality

Sources of natural mortality for gray whales include predation, disease, entrapment in ice (IWC 2003), and starvation. Killer whales are the primary natural predator of gray whales. There are many anecdotal reports of killer whale interactions with gray whales, but it is difficult to quantify the proportion of the gray whale stock killed or approached by killer whales each year (Rice and Wolman 1971; Fay et al. 1978; Jones and Swartz 1984; Poole 1984; Goley and Straley 1994; George and Suydam 1998). Predation is by transient (mammal-eating) killer whales, and studies suggest that gray whale calves may be particularly vulnerable during their northward (spring) migration (Ternullo and Black 2002). The frequency of tooth scars on gray whale carcasses indicates that killer whale attacks often are not fatal (56 FR 58872, November 22, 1991). Other predators are sharks, including the great white shark (*Carcharodon carcharias*) and tiger shark (*Galaeocerdo cuvier*) off California and Mexico (Jones and Swartz 2002).

3.4.3.2 Historic Status of the Gray Whale Population

3.4.3.2.1 Estimates of Historic Abundance

Estimates of ENP gray whale population size (i.e., abundance) before commercial exploitation vary. Reilly (1981) estimated that there may have been 24,000 gray whales before 1846. Henderson (1984) estimated that the original population was between 15,000 and 20,000 whales. The carrying capacity of the gray whale population was recently estimated to be 23,686 whales (standard error [SE] equals 1,788)(Rugh et al. 2008). The standard error is the measure of certainty (precision) for the estimate of population size, and it is used to construct a confidence interval around the estimate; for further discussion of population estimates and confidence intervals, see Section 3.4.3.4.1, Abundance Data. Scammon (1874) proposed that the population numbered about 30,000 whales from 1853 to 1856. From 1845 to about 1900, American whalers took gray whales from the winter grounds in Baja to the summer feeding areas in the subarctic, removing approximately 11,300 whales from the population between 1845 and 1874 (Scammon 1874; Henderson 1984). Hunts in and near the lagoons greatly reduced the reproductive capacity of the population by killing the females with calves (Swartz et al. 2006). From approximately 1914 to 1946, modern industrial whaling by the United States, Japan, Norway, and the Soviet Union in the North Pacific took an estimated 940 gray whales in all seasons (Reeves 1984).

More recently, Alter et al. (2007) used a genetic approach to estimate prewhaling abundance of gray whales and reported DNA variability indicative of an ENP gray whale population of approximately two to four times more numerous than today's average census size. (The ENP gray whale population was last estimated to be 20,110 whales (Rugh et al. 2008)). Alter et al. (2007) note that their estimate likely measures both the eastern and western gray whale stocks together, and that an important question is whether carrying capacity has declined over time. If it has, then gray whales may be reduced from historical numbers but may have reached a new, lower carrying capacity today. The lower range of the confidence interval reported in Alter et al. (2007) is consistent with a historic abundance of about 30,000 whales each for the western and eastern North Pacific stocks of gray whales. An abundance of 30,000 gray whales in the Eastern North Pacific stock is within the confidence limits for estimates of carrying capacity reported by Wade (2002).

Estimates of gray whale population size after commercial exploitation also vary. Reilly (1981) estimated that the population declined to below 12,000 whales, Henderson (1984) estimated that the population did not exceed 8,000 to 10,000 whales, and Butterworth et al. (2002) estimated a number between 4,000 to 5,000 whales, down to as low as 1,500 to 1,900 whales after commercial whaling stopped in 1937 and 1938. For a discussion of aboriginal subsistence whaling for ENP gray whales, refer to Section 3.4.3.6.1, Aboriginal Subsistence Whaling.

3.4.3.2.2 Protection and Recovery after Commercial Exploitation

Gray whales have been protected by a suite of international agreements and federal laws initiated in 1937. As a result, the gray whale population recovered since its depletion caused by commercial whaling in the early 1900s (Rugh et al. 2005). For a summary of aboriginal subsistence whaling for ENP gray whales conducted during this time, refer to Section 3.4.3.6.1, Aboriginal Subsistence Whaling. A summary of treaties and laws relevant to protection and recovery of gray whales is provided below, and they are explained in more detail in Section 1.2, Legal Framework.

Two federal laws are discussed both here and in Chapter 1. The ESA is explained more fully here because the gray whale population has recovered to population levels that supported delisting (i.e., the ESA no longer applies to the extent of the other laws described in Chapter 1). The listing history and associated abundance estimates provide context relevant to describing recovery of the population after commercial exploitation.

1. 1937 International Agreement for the Regulation of Whaling — The 1937 Agreement protected gray whales from commercial whaling, but included an exception to allow for aboriginal subsistence use. Norway, the United States and others signed it in 1937 (Reeves 1984) and Canada, the Soviet Union, and Japan signed it later (1938, 1946, and 1951, respectively). Consequently, since 1951, all nations with factory ships operating in the North Pacific Ocean have been subject to the provisions protecting gray whales from commercial whaling (Reeves 1984). During the fall southward and spring northward migrations between 1959 and 1969, scientists in the United States took 316 gray whales off the coast of central California under IWC special research permits to establish the status of the population (Rice and Wolman 1971).

2. 1946 International Convention for the Regulation of Whaling — The ICRW continued the 1937 Agreement's prohibition on commercial whaling of gray whales, as well as allowing aboriginal subsistence whaling (Section 1.2.4.1, International Whaling Governance under the ICRW, contains more detail).

3. Whaling Convention Act — The WCA prohibits commercial whaling, except for aboriginal subsistence whaling consistent with the IWC Schedule (i.e., regulations of the IWC that are an integral part of the ICRW) (Section 1.2.4, Whaling Convention Act, for more detail).

4. Endangered Species Act — The gray whale was listed as an endangered species under the statute preceding and replaced by the ESA (35 FR 8495, June 2, 1970). Following a comprehensive evaluation of its status (Breiwick and Braham 1984), NMFS concluded on November 9, 1984 (49 FR 44774), that the population should be listed as threatened, instead of endangered. No further action was taken until 1991 when a subsequent review, made available to the public on June 27, 1991 (56 FR 29471), showed that the best available abundance estimate (in 1987/1988) was 21,296 whales, recalculated to be 22,250 whales in 1987/1988 after Rugh et al. (2005) applied new correction factors. The latest available abundance estimate is 20,110 whales (SE equals 1,766) for the census conducted in 2006/2007 (Rugh et al. 2008). The estimate of increase is 2.59 percent (SE equals 0.28 percent) when using data from 1967/1968 to 1997/1998, 1.86 percent (SE equals 0.32 percent) when using data from 1967/1968 to 2001/2002, and 1.59 percent (SE equals 0.31 percent) when using data from 1967/1968 to 2006/2007 (Rugh et al. 2005; J. Breiwick, pers. comm.. 2008; Rugh et al. 2008). There are indications that this population

is approaching the K of its environment (Reilly 1992; Wade and DeMaster 1996; Wade 2002; Wade and Perryman 2002; Moore 2005; Rugh et al. 2008).

On November 22, 1991, NMFS proposed to remove the gray whale population from the list of endangered and threatened wildlife (56 FR 58869). NMFS published a final notice of determination (58 FR 3121, January 7, 1993) to remove the population from the list because the species had recovered to near its estimated original population size and was neither in danger of extinction throughout all or a significant portion of its range, nor likely to again become endangered within the foreseeable future. On June 16, 1994 (59 FR 21094), the gray whale population was formally removed from the list of endangered and threatened wildlife. As required under Section 4(g) of the ESA, NMFS drafted a plan to monitor the status of the stock for at least five years following the delisting. NMFS' comprehensive status review, completed in August of 1999, recommended that the population continue under a non-threatened classification (Rugh et al. 1999).

In 2001, NMFS received a petition to relist the gray whale under the ESA, but found that the petition did not present substantial scientific or commercial information indicating that relisting was warranted (66 FR 32305, June 14, 2001). NMFS has continued monitoring the population since delisting.

The Pacific stock of gray whales is no longer a threatened or endangered species. Therefore, the requirements of the ESA no longer apply to this population.

5. Marine Mammal Protection Act – The MMPA established a moratorium on the taking of gray whales, along with all marine mammal species, subject to certain exceptions (Section 1.2.3, Marine Mammal Protection Act, for more detail).

3.4.3.3 Distribution and Habitat Use

This section describes the areas that whales occupy and their feeding, breeding, or calving activities over various periods. Distribution and habitat use on a seasonal timescale are described above in Section 3.4.3.1.4, Seasonal Migrations, in the context of the long-distance migrations that are thought to have evolved in response to seasonal mixing and upwelling of oceanic waters affecting the production, dispersion, and concentration of prey (Moore 2005; Swartz et al. 2006). These seasonal migrations have led to a description in the scientific literature of 'summer feeding grounds' and winter 'breeding (or calving) grounds.' These categories are misleading because feeding and mating behavior occur throughout the range during all seasons (Rice and Wolman 1971; Swartz et al. 2006). Gray whales feed opportunistically on a diversity of prey species throughout their entire range, including along the migratory corridor and in their winter range (Nerini 1984). Similarly, they breed in the fall in their summer range at the onset of the southward migration, breed and calve along the migratory corridor, and breed and calve in the winter on the winter grounds (Shelden et al. 2004; Rugh et al. 2005; Swartz et al. 2006). The summer range is primarily a feeding area, but also serves as a weaning and breeding area. The winter range is primarily a resting or nursing area where there is also breeding, calving, and feeding. The migratory corridor supports a continuum of behaviors (feeding, breeding, and calving) as whales shift between summer and winter ranges.

Gray whale distribution and habitat use exhibit within-season and year-to-year variability within their range (Yablokov and Bogoslovskaya 1984; Gardner and Chávez-Rosales 2000). Additionally, their entire range shifts over longer time frames in response to long-term environmental variability such as oceanic climate cycles (e.g., El Nino-Southern Oscillation, Pacific Decadal Oscillation, and Arctic Oscillation). Gray whale distribution and habitat use are dynamic and inherently linked to the variability of the prey base and changing physical properties of the ocean environment (Section 3.4.3.1.3, Feeding Ecology and Role in the Marine Ecosystem).

3.4.3.3.1 Summer Range Distribution and Habitat Use

Most of the whales in the gray whale population migrate north of the Alaska Peninsula during the spring northward migration, but some gray whales remain south of the Alaska Peninsula to feed throughout the summer and fall. This discussion uses the Alaska Peninsula/Aleutian Island chain as a conceptual north/south line dividing the summer range into the northern and southern portions. The northern portion of the summer range is also referred to in the literature as ‘northern seas’ (Nerini 1984; Gardner and Chávez-Rosales 2000) and ‘primary,’ ‘principal,’ ‘traditional,’ ‘northern,’ or ‘summer’ feeding grounds (e.g., Braham 1984; Nerini 1984; Swartz 1986; Darling et al. 1998; Moore et al. 2000; Dunham and Duffus 2002; Findlay and Vidal 2002), while the southern portion of the summer range is also referred to as the southern feeding grounds ‘alternative feeding grounds [or area]’ (Moore et al. 2007) and sometimes the ‘migratory [or migration] corridor’ (e.g., Braham 1984; Nerini 1984). Distribution and habitat use in both the northern and southern portions of the summer range are described below.

Northern Portion of the Summer Range

The extent of gray whale distribution and habitat use in the northern portion of the summer range (Figure 3-3) is not well-documented, and patterns are difficult to discern; much of the data come from historical whaling records or observational efforts that are not consistent or comparable (Berzin 1984; Clarke and Moore 2002). Sighting data from Soviets and Americans throughout 1958 to 1993 are summarized in Clarke and Moore (2002), but the information is of limited value due to the inconsistent methods by which the data were collected. Generally speaking, whales are distributed as far east as the Canadian Beaufort Sea (Rugh and Fraker 1981), as far west as the Eastern Siberian Sea along the coastal shelf of Siberia and near Wrangel Island (Berzin 1984; Reilly 1984; Miller et al. 1985; IWC 2006a), along the north and south coasts of the Chukotkan Peninsula (Berzin 1984; Miller et al. 1985), at shoals in the northeastern Chukchi Sea near Barrow, Alaska (Moore et al. 2000), and in the northern Bering and southern Chukchi Seas in areas between the Bering Strait and St. Lawrence Island (Moore et al. 2003).

Sea ice cover probably influences distribution to some extent, but the primary factor influencing distribution and habitat selection appears to be availability of prey (Moore 2000; Clarke and Moore 2002). During the summer months in the Alaska Beaufort Sea (i.e., western Beaufort Sea) and southern Chukchi Sea, gray whales selected coastal and shoal habitats (less than 115 feet [35 meters] deep) with less than 20 percent ice cover (Moore et al. 2000). Scientists at the 2006 IWC meeting reported that six satellite-tagged individual whales were also monitored moving north to these regions in open ice leads (i.e., open water paths in the ice) during mid-June, but they moved through areas that had 30 to 40 percent ice cover at times (IWC 2006a). In the fall months, whales have been observed feeding in more than 70 percent ice cover. Moore et al. (2000) concluded that gray whale habitat selection is not strongly related to ice conditions (ratios for numbers of whales at various depths were similar for both light and heavy ice years); instead, gray whale distribution is primarily linked to prey density. During years when strong surface winds result in the cross-shelf transport of upwelled, nutrient-rich waters, benthic prey species are probably more productive and densely aggregated in nearshore coastal and shoal habitats (Moore 2000). During years of moderate to low wind mixing and transport, gray whales select shelf and trough habitats further offshore, where currents are directed by bathymetric features (i.e., seafloor geology) and may provide migration cues to southbound whales (Moore et al. 2000). The overall abundance of the gray whale population also probably influences distribution in the northern portion of the summer range (and elsewhere) because, as the gray whale population increases, the range may expand as individuals forage more widely for limited food resources. Rugh et al. (2001) proposed that the week's delay in southward migration timing after 1980 may have been due to a wider distribution of the population as their search for food covered increasingly greater areas, making the trip south longer. This effect of a larger population leading to a wider dispersal was also noted by other authors (Yablokov and Bogoslovskaya 1984; Stoker 2001).

Within-season movement of gray whales has been documented over the years, leading researchers to the conclusion that whales in the northern portion of the summer range exhibit constant and extensive local migrations between feeding areas; they do not stay in one area for the entire season (Yablokov and Bogoslovskaya 1984; IWC 2006a). Individual whale movement in the northern portion of the summer range has not been documented to the extent of individual whales in the southern portion of the summer range (photographic-identification [photo-id] is impractical in such a large and remote area), but scientists at the 2006 IWC meeting reported preliminary results from a recent satellite-tagging study. The tagging data show that four individual whales used the southern Chukchi Sea for more than three months, with the distribution of the individual whales overlapping by only 3 percent within this area (IWC 2006a).

Long-term shifts in the summer range have also been described recently and are thought to be related to the operation of two major oceanic climate cycles: the Arctic Oscillation and the Pacific Decadal Oscillation. These two cycles generally occur in the North Pacific every 10 to 30 years, last 30 to 40 years, and have distinct warm and cool phases due to changes in sea surface pressure and sea surface temperature. The operation of both the Arctic Oscillation and Pacific Decadal Oscillation appears to be causing a major ecosystem shift in the Bering Sea, a transitional area that is at a crossroads between the Pacific Ocean and the Arctic Ocean and is, therefore, influenced by both cycles (Bond 2006; Grebmeier et al. 2006).

The Bering Sea (northern Bering and southern Chukchi Sea) was once considered the primary gray whale feeding ground (Braham 1984; Moore et al. 1986; Kim and Oliver 1989; Moore et al. 2000). During the late 1970s to early 1980s, it was characterized by cold climate conditions with extensive seasonal ice cover and high benthic productivity (Grebmeier et al. 2006). Time-series studies from the Chirikov Basin (between St. Lawrence Island and the Bering Strait) show that in 1980, *Ampeliscid* amphipods were the primary prey items of gray whales, sampled at record-high densities from the 1970s to mid 1980s (Stoker 1981; Yabolokov and Bogoslovskaya 1984; Grebmeier et al. 1989; Highsmith and Coyle 1990). The amphipod prey base declined by 30 percent between 1986 and 1988 (Highsmith and Coyle 1992; Sirenko and Koltun 1992). This reported decline in benthic biomass did not have an immediate observable effect on gray whale abundance. A subsequent gray whale mortality event in 1999/2000, coupled with observations of emaciated whales, led scientists to conduct aerial surveys of the Chirikov Basin in 2002 to compare distribution and relative abundance with the 1980s data (Moore et al. 2003). Sighting rates of gray whales in the Chirikov Basin were 3 to 17 times lower than they had been in the 1980s (Moore et al. 2003; Grebmeier et al. 2006). Benthic productivity of the prey had declined precipitously, and only the southern Chukchi Sea supported dense aggregations of whales (Moore et al. 2007).

The Bering Sea is now characterized by warmer conditions with less sea ice cover and lower benthic productivity (Grebmeier et al. 2006). Gray whales have responded by foraging in other areas (Moore et al. 2003; Moore 2005; Moore et al. 2007). Observers are now seeing larger feeding aggregations in different parts of the northern portion of the summer range, north of the Bering Strait in the south-central Chukchi Sea and just north of St. Lawrence Island in the northern Bering Sea (south of the Chirikov Basin), an area that was previously recorded as devoid of gray whale feeding (Clarke and Moore 2002; Moore et al. 2003). Scientists recently reported at the 2006 IWC Scientific Committee meeting that a large proportion of 17 satellite-tagged whales fed extensively in the Chukchi Sea; six whales retained their tags for more than 100 days, and all six spent most of their time in the Chukchi Sea (IWC 2006a). These data support an increase in foraging in that area. Observers have also documented feeding that has not been seen previously in the southern portion of the summer range, such as near Kodiak Island and in the Gulf of Alaska (near Sitka) (Moore et al. 2003).

Southern Portion of the Summer Range

Not all ENP gray whales make the full migration every year north of the Alaska Peninsula/Aleutian Island chain. Some whales spend all or part of the summer feeding in the southern portion of the summer range. There is no evidence that the whales feeding in this portion of the summer range are genetically or demographically unique, and both NMFS and the IWC continue to treat ENP gray whales as a single stock for management purposes. Nevertheless, in its 2001 EA, NMFS considered the effect that a Makah hunt might have on the group of whales using the southern portion of the summer range, which it termed the ‘Pacific Coast Feeding Aggregation’ or PCFA. The following discussion describes the studies of whales in the southern portion of the summer range and how information from these studies is relevant to analyzing the effects of a potential gray whale hunt in the Makah Tribe’s U&A.

For more than four decades, gray whales have been observed feeding south of the Alaska Peninsula and Aleutian Island chain during the late spring, summer, and fall feeding periods, past the times typically associated with the end of the spring northward migration and before the times typically associated with the onset of the fall southward migration. Between late spring and fall, gray whales have been observed off coastal Mexico (Patten and Samaras 1977); southern, central, and northern California (Mallonée 1991; Calambokidis et al. 2004a); southern and central Oregon (Herzig and Mate 1984; Sumich 1984); northern Washington and northern Puget Sound; southwest and western Vancouver Island; British Columbia and north British Columbia (Darling 1984); and Sitka and Kodiak Alaska (Calambokidis et al. 2002; Calambokidis et al. 2004a; Moore et al. 2007). During line transect vessel surveys conducted in the Olympic Coast National Marine Sanctuary from mid-June through late July, 1995 through 2002, for instance, Calambokidis et al. (2004b) documented the presence of five gray whales in the migratory corridor off the Washington coast, averaging 3.1 miles (5 km) from shore in 65.6 feet (20 m) of water. Feeding gray whales occurred off California even in the 1920s when population numbers were very low (Clapham et al. 1997; Moore et al. 2007). In the literature, these observations have often been described as summer sightings (Gosho et al. 2001), and the whales have been referred to as summer feeders or summer residents, a term first used by Pike (1962) to describe gray whales that occurred off British Columbia from June through September. Researchers have used the term 'summer' to refer to a longer period than is generally associated with the season, describing sightings off the Washington coast between June 1 and November 30 as summer feeding (e.g., Calambokidis et al. 2002; Calambokidis et al. 2004a).

In the early 1970s scientists discovered they could identify individual whales by dorsal area shape, scars, and coloration patterns that are visible above the surface of the water when the whales arch to dive (Darling 1984). Photographing and identifying individual whales, noting the location and time of sighting, and comparing photographs within and between years has allowed scientists to study abundance, distribution, movements, and survival of whales using the southern portion of the summer range. Over time researchers have established summer survey areas either because the area is one where whales were likely to be found feeding or because the area is one where a management activity occurs (for example, a counting station along the migration route, or an area where a hunt is proposed). The following discussion focuses on survey areas because that is how data are collected, reported and analyzed. Although a researcher's designation of a survey area will not necessarily correspond to areas that are biologically meaningful to individual whales or groups of whales, they are nevertheless useful for analyzing local effects.

From 1972 to 1981, researchers conducted photo-id studies in survey areas off the west coast of Vancouver Island, British Columbia (Hatler and Darling 1974; Darling 1984). Both effort and survey areas varied between years. Survey effort ranged from less than 5 days in 1972 to 54 days in 1976. Five discrete areas were surveyed. Surveys began in the 24.9-mile [40-kilometer] stretch of coast around Wickaninnish Bay near Tofino on the central west coast of Vancouver Island (surveyed from 1972 to 1981). Later surveys extended north to include three more discrete survey areas (Estevan Point, between Clayoquot Sound and Nootka Sound, surveyed from 1976 to 1981; Cape Scott, surveyed in 1977 and 1979; and Calvert Island, surveyed in 1977 and 1979), then survey efforts expanded south to include the West Coast Trail survey area (surveyed from 1979 to 1981). In 1976 and 1977, the greatest number of whales identified in any one summer was 34 (some individuals were resighted from prior years), corresponding to maximum effort and including one year when four of the five survey areas were surveyed (excluding West Coast Trail, which was added later in 1979). Flights to locate whales missed by the boat-based surveys were carried out weekly in 1976 and sporadically in other years. Sixty-three percent of the identified whales were seen in more than one summer, and thirty-seven percent were identified in only one summer (i.e., they were never resighted). One whale was seen in seven consecutive years and others were seen across spans of time as long as eight summers but were not seen in every summer.

On the basis of these data, Darling (1984) surmised that 35 to 50 whales were present during 1972 to 1981 off the coast of Vancouver Island in any one summer, but they were not all the same whales each year. During 1975 to 1981, Darling (1984) identified 93 total individual whales that were present in this study area for at least one year. Darling (1984) noted that other researchers surveying in areas off of Oregon thought there were approximately 75 total individual whales identified each year of their effort, so he surmised that there were at least 100 gray whales in the British Columbia-Washington-Oregon area in any one summer.

Within-season and between-year movement of identified and resighted whales was also recorded. Some identified whales remained in the same survey area throughout the summer; for example, two whales remained in Wickaninnish Bay survey area for at least 80 days. Other whales traveled considerable distances in search of food; for example, a whale identified in the Wickaninnish Bay survey area reappeared in the Estevan Point survey area 47.9 miles (77 kilometers) away. Between years, identified whales reappeared at least 93.3 miles (150 kilometers) away from where they were in a prior year.

More recently, from 1984 to 1993, researchers from Cascadia Research Collective conducted photo-id studies of eight discrete survey areas in the inland waters of southern, central, and northern Puget Sound and Hood Canal; the Strait of Juan de Fuca; and the outer Washington coast, including Grays Harbor (Calambokidis et al. 1994). Survey efforts varied between summers and areas, ranging from 16 days in 1990 to 50 days in 1991. Calambokidis et al. (1994) developed a catalog of photo-identified whales; 76 individual photo-identified whales were in the catalog by 1993. Of these 76 photo-identified whales, only 17 whales (22.3 percent) were resighted in more than one year, either in the same area or a different area including British Columbia. Between-year resightings of photo-identified whales were most common in the northern Puget Sound survey area, where five of seven identified whales were resighted in subsequent years. They were least common in the southern and central Puget Sound and Hood Canal survey areas, where 1 of 18 identified whales was resighted in subsequent years. Individually identified whales were resighted an average of 47 days later, and the longest time between first and last sightings in a season was 112 days.

These photo-id efforts collectively demonstrate that some of the gray whales feeding in the southern portion of the summer range remain for extended periods and that some of the whales return to the same general feeding areas in later years, though not necessarily every year (Darling 1984; Calambokidis et al. 1994). The studies also demonstrate that many of the gray whales photo-identified were not resighted in subsequent years, that new individuals were photographed every year, and that some whales inhabited different areas in different years (Darling 1984; Calambokidis et al. 1994). These observations were important because they suggest a lack of strong site fidelity (returning to the same previously occupied breeding or feeding location), which can indicate that a particular group of animals is different from the rest of the population in a biologically meaningful way (i.e., genetic or behavioral differences). Such differences can indicate stock structure and demographic independence, which have management implications. Animals with strong site fidelity may be unlikely to move or select new habitats if their traditional habitat becomes less favorable (Switzer 1993; Quan 2000).

In response to the Makah request to resume their traditional hunt of gray whales, NMFS initiated photo-id studies of gray whales off the coast of Washington in 1996 to better understand distribution (including site fidelity and habitat use) and abundance (Gearin and DeMaster 1997; Gosho et al. 1999; Gosho et al. 2001). The agency was responding to federal conservation and management obligations pursuant to the ESA monitoring plan following the 1994 delisting and was also operating under federal trust obligations, triggered by the Makah Tribe's request to hunt gray whales starting in the 1998 to 2002 five-year IWC catch limit time frame (Gearin and DeMaster 1997). NMFS was investigating whether the proposed level of harvest was sustainable for the area. The agency focused its survey efforts in the Strait of Juan de Fuca (from Tatoosh

Island to Sekiu), the northern Washington coast (Tatoosh Island to Carroll Island), and southern Vancouver Island. NMFS noted that the survey area had limitations and indicated that effort should be extended beyond these three areas south to Grays Harbor (the area surveyed by Calambokidis et al. 1999) and north to west Vancouver Island (the area surveyed by Darling 1984) to increase the probability of sighting gray whales in Washington and British Columbia waters (Gosho et al. 1999).

From 1998 to the present, NMFS funded and collaborated with Cascadia Research Collective and other researchers to photo-id gray whales. This collaboration has allowed researchers to combine resources and results and cover broader survey areas within the southern portion of the summer range, from southern California to Kodiak Island. Effort within survey areas varied, with most intensive coverage in the survey areas along the southern and western coast of Vancouver Island and just north of Vancouver Island (Calambokidis et al. 2002; Calambokidis et al. 2004a). Researchers obtained photographic identifications of between 1,159 and 1,499 whales each year from 1998 to 2003. From those photographs, 600 individual whales were identified (multiple photographs were taken of most whales in each year, and some whales were seen in more than one year, so the number of photos taken exceeds the number of whales uniquely photo-identified). From those 600 whales, 477 individual whales were identified between California and Kodiak during the June 1 through November 30 summer feeding period, outside the time period of the northward migration (Calambokidis et al. 2004a). Calambokidis et al. (2004a) limited most of their analyses to the 408 whales seen in the core survey region from northern California to northern British Columbia (which they also call the 'Pacific Coast Feeding Aggregation' or PCFA survey area – see Figure 3-4 and Figure 3-5). Whales sighted in northern and southern Puget Sound were rarely seen in other feeding areas during the summer feeding period, so they were excluded from the analysis in Calambokidis et al. (2004a).

Of the 408 unique whales seen in the core region, 49 percent were seen between June 1 and November 30 in only one of the six years (excluding those first seen in 2003), which demonstrates that many of the newly seen whales did not return in subsequent years. Twenty-five percent of the whales were seen in every summer after their initial identification, including 49 whales that were seen in all six years. The remaining 26 percent were seen more than once but not in every year. Some of the latter whales were seen in Kodiak and Southeast Alaska in years that they were not seen in the core region (Calambokidis et al. 2004a). Five of the ten whales identified in Southeast Alaska and eight of the 46 whales seen in Kodiak had been seen farther south in the core survey region. For example, Whale 130 was only seen in Southeast Alaska in

1999, but had been seen in every other year somewhere between Oregon and northern Vancouver Island. Likewise, Whale 232 was only seen in Kodiak in 2002, but was seen along Vancouver Island in 2000, 2001, and 2003. Whale 152 was photo-identified in Kodiak in 2002, but previously had been seen along the west coast of Vancouver Island in 1999, as early as 1995 in the Cape Caution, British Columbia, area, and in 1992 in the Clayoquot Sound, British Columbia, survey area (Calambokidis et al. 2003). Another example is Whale 68, which was seen in Southeast Alaska in 1998 and 1999, was not seen in the core region from 1998 to 2003, and was seen in northern Washington during 1996 and 1997. While these are only a few examples of whale movements, they illustrate the extensive inter-year movement of whales, which partially explains the gaps in the observations for some whales and the disappearance of others from the core survey region.

Whales using the core survey area exhibited a wide range of movement across and within years. The 49 whales seen in each of the six years provide a useful example. None of those whales was seen exclusively in a single area, and 49 percent were seen in at least four of the six survey areas from 1998 to 2003. However, whales did regularly visit the same areas across years. Seventy-one percent were seen in at least one of the areas during five or more of the six years. Those areas were primarily along Vancouver Island, which partially reflects the larger amount of survey effort (Calambokidis et al. 2004a). Thus, some whales regularly visit an area, but they use other areas as well. Calambokidis et al. (2004a) showed that whales seen in more years appeared in more regions.

Within-season movement of photo-identified and resighted whales in the summer feeding period was extensive (Calambokidis et al. 2004a). For each survey area examined, there was a pattern of decreasing movement between survey areas within season for each survey area farther to the north or south (Calambokidis et al. 2004a). This pattern demonstrates that whales do focus on specific areas within the summer season, but they will move in search of food, most likely to neighboring areas. There have been examples of large-scale movements within a year. One whale, originally photo-identified in a southeastern Alaska survey area around September 1999, was resighted far south about a month later in a northern California survey area (Calambokidis et al. 2004a). Another whale moved in the opposite direction; researchers originally identified it off southern Vancouver Island during June 2003, it swam at least 1,104 nautical miles in 34 days or less, and it reappeared off Kodiak on August 9, 2003 (Calambokidis et al. 2004a). Within-season and between-year movements of gray whales likely relate to changes in productivity and prey availability. Darling et al. (1998), for example, noted a long-term change in the use of the

Wickaninnish Bay survey area off the central west coast of Vancouver Island, British Columbia. From 1966 to 1977, whales were consistently present from May to September, but use of the habitat during summer was becoming less consistent by 1977. Since 1989, whales have been observed feeding mostly on pelagic prey (e.g., crab larvae and swarming amphipods), although occasional bouts of benthic feeding also occurred throughout this time, such as in April 1996 (Darling et al. 1998).

Similarly, Moore et al. (2007) noted that tens to hundreds of gray whales have been seen consistently along the southeastern coast of Kodiak Island since 1999; 350 to 400 feeding gray whales were counted during a single aerial survey in July of 2000. Moore et al. (2007) proposed that the high counts of whales near Kodiak in 2000 and 2001 may be a result of prior oversight (i.e., the whales may not have been sighted because Kodiak has long been considered part of the migratory corridor and not part of the summer range). The high counts may also be related to feeding opportunities resulting from ecosystem responses to the 1997 to 1998 El Nino in the North Pacific (see El Nino discussion below in the Winter Range Distribution and Habitat Use Section). The repeat occurrences of whales at certain sites, appearance at new sites, and discontinued use of other sites are probably related to gray whale foraging patterns and behavior, prey distribution, abundance, and predictability (Darling et al. 1998).

In deriving estimates of 35 to 50 gray whales for Vancouver Island and 100 whales for the Pacific Northwest, Darling (1984) defined abundance as the number of gray whales he could find in his study sites in any particular year. In its 2001 EA, NMFS based its evaluation of effects on gray whale abundance using (1) a larger survey area than Darling considered and (2) the entire group of whales seen in the area (in more than one year), not just those seen in a single year. Recognizing that whales are highly mobile and move freely in a larger area than the Makah U&A during the summer feeding period, NMFS considered the survey area from northern California to northern British Columbia to be the most appropriate area to use for managing a gray whale harvest to avoid local depletions, and termed the whales using that area during the summer feeding period the ‘Pacific Coast Feeding Aggregation’ (PCFA). For evaluating effects on abundance, NMFS also considered the entire group of whales seen in the area in more than one year, not just the number of whales seen in a single year (some of which might return and some of which never return).

The Ninth Circuit in *Anderson v. Evans* (2004) found that the scale of NMFS’ inquiry in the 2001 EA was not sufficiently fine – that NMFS must consider not just effects to the ENP gray whale stock as a whole and the PCFA group of whales, but effects to the smaller group of whales frequenting the Makah Tribe's U&A – the "relatively small group of whales [that] comes into the area of the Tribe's hunt each summer,... about sixty percent of [which] are returning whales (although, again, not necessarily whales returning annually)" (*Anderson v. Evans* 2004). In holding that NMFS was required to prepare an EIS, the court focused on impacts to the local area.

> Even if the eastern Pacific gray whales overall or the smaller PCFA group of whales are not significantly impacted by the Makah Tribe's whaling, the summer whale population in the *local* Washington area may be significantly affected. Such local effects are a basis for a finding that there will be a significant impact from the Tribe's hunts. *See* 40 C.F.R. § 1508.27(a). Thus, if there are substantial questions about the impact on the number of whales who frequent the Strait of Juan de Fuca and the northern Washington Coast, an EIS must be prepared (*Anderson v. Evans* 2004).

Subsequent to NMFS' preparation of the 2001 EA, which focused on the PCFA area as an appropriate scale for managing a Makah gray whale hunt, Calambokidis et al. (2004a) proposed that a smaller survey area within the PCFA survey area, from Oregon to Southern Vancouver Island (ORSVI), was most appropriate for managing a Makah gray whale hunt. To reach this conclusion, they focused on whales identified in the survey areas corresponding to the Makah U&A (the northern Washington coast and Strait of Juan de Fuca survey areas). They examined the degree to which whales sighted in these survey areas were also sighted in the ORSVI and PCFA survey areas (Figure 3-5).

They found that of the whales seen in the PCFA survey area during the six years of their study, 30 percent were also seen in the Makah's U&A (northern Washington coast and Strait of Juan de Fuca survey areas). In contrast, of the whales seen in the ORSVI survey area during the six years of their study, more than half were also seen in the Makah's U&A. Based on the relatively high rate of interchange between the ORSVI and the Makah U&A, compared to the rate of interchange between the PCFA and the Makah U&A, they concluded that "it is both logical and reasonable to use ORSVI as the region for abundance estimation in setting quotas for a harvest of whales from the [Makah U&A] region."

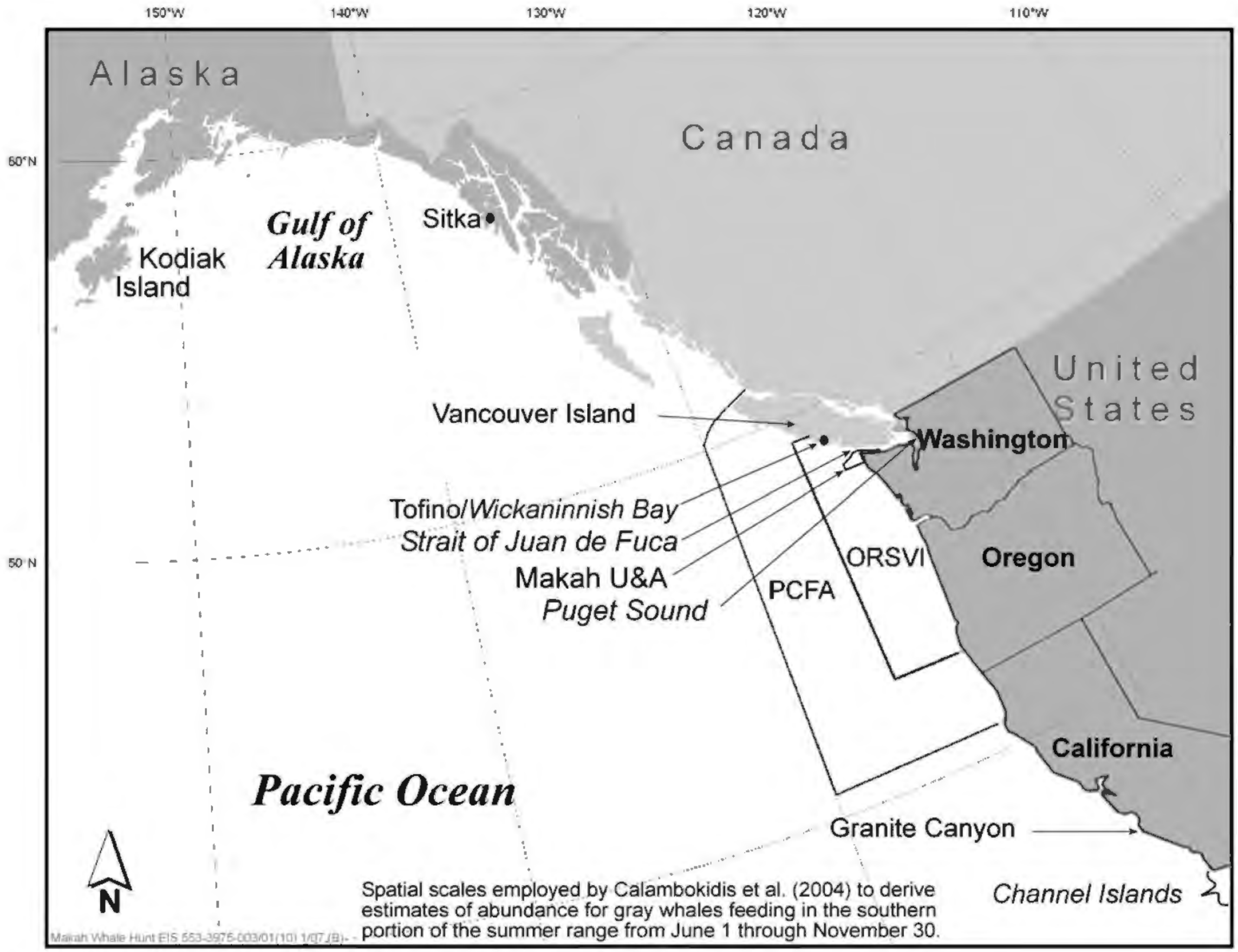


Figure 3-4. Spatial Scales in the Project Area – PCFA and ORSVI Survey Areas

Individual Survey Areas (North to South)	Combined Survey Areas		
	Makah U&A	ORSVI	PCFA
Coastal Waters			
Kodiak Alaska			
Southeast Alaska			
Northern British Columbia			
Western British Columbia			
Southern Vancouver Island			
Strait of Juan de Fuca			
Northern Washington Coast			
Grays Harbor			
Northern Oregon			
Southern Oregon			
Northern California			
Central California			
Inland Waters			
North Puget Sound			
Puget Sound & Hood Canal			

Figure 3-5. Individual Survey Areas Within the Makah U&A, ORSVI, and PCFA Survey Areas

Gray whales seen in any of the survey areas each year include (1) immigrating whales (not previously identified, either because they were new to the area or because they were there in a prior year but were not photographed); (2) returning whales (previously identified); and (3) emigrating whales (previously identified but not sighted during the subsequent summer(s), either because they never returned, because they may return in later summers, or because they were there but not photographed). Calambokidis et al. (2004a) proposed that it was more appropriate to use open population models than closed population models to estimate abundance of gray whales in the PCFA and ORSVI survey areas. Because new whales are entering a given area each year (gains through immigration and recruitment) and some new whales never return (losses through emigration and death), closed population models are not appropriate.

Calambokidis et al. (2004a) developed estimates of abundance from the open-population models that would be unlikely to yield higher results than true abundance. They assumed that all whales using either the PCFA or ORSVI survey areas in any one or more years were photographically identified (an assumption that most likely results in underestimating the true abundance of whales in these areas, since it is likely not all whales using the area are seen, photographed, and identified). Calambokidis et al. (2004a) estimated abundance in 1998 as the total number of whales seen in 1998. They estimated abundance in 1999 as the total number of new whales seen in 1999 and the predicted number of whales from the 1998 cohort that survived and would return at some time (not permanently emigrate) in subsequent years. Researchers constructed the estimates for the remaining years similarly as the sum of the newly seen whales and returning surviving whales from cohorts of previous years. They also constructed abundance estimates of returning whales by excluding the newly seen whales.

For the PCFA survey area, Calambokidis et al. (2004a) estimated that abundance increased from 129 whales in 1998 (count of all photographically identified whales) to a peak of 225 whales in 2002 (standard error equals 6.6). They estimated abundance increases of returning whales from 102 whales (standard error equals 5.7) in 1999 to a peak of 176 whales (standard error equals 20.5) in 2003. The average annual increase of returning whales was 18.5 whales from 1999 to 2003. For the smaller ORSVI region, estimated abundance increased from 84 whales in 1998 (count of new whales) to a peak of 150 in 2003 (standard error equals 20.5), and abundance estimates of returning whales increased from 61 whales (standard error equals 5.0) in 1999 to a peak of 122 whales (standard error equals 20.5) in 2003. The average annual increase of returning whales was 15.2 from 1999 to 2003. The estimates of immigrants into the area may be too high due to the assumption that all whales appear in each year. This ignores the possibility of a whale immigrating in a previous year and, thus, being missed. The data nevertheless demonstrate sightings of many new whales each year, some of which return in subsequent years.

Calambokidis (2007) and Laake (2007, pers. comm.) provided updated information on gray whale identifications throughout the southern portion of the summer range. During 1 June-30 November for 1998-2005, 464 unique whales were seen in the PCFA (from northern California to northern British Columbia) (Table 3-2). Sixty-seven percent (311 of the 464 whales seen in the PCFA) were seen within the smaller ORSVI region (Oregon to southern Vancouver Island)

(Table 3-3) and approximately 25 percent (115 of the 464 whales seen in the PCFA) were seen within the smaller Makah U&A (northern Washington Coast and Strait of Juan de Fuca) (Table 3-4).

The average number of whales identified in any one year was 160, 87, and 22 in the PCFA, ORSVI and Makah U&A regions respectively. However, those numbers do not represent the total numbers of whales that use each of these areas because not all whales using a region in a year are seen, not all whales return to the same region each year, and not all of the whales return to the PCFA each year.

The annual average number of newly seen whales (excluding 1998 when all are new by definition) was 47.9, 32.4, and 11.4 for PCFA, ORSVI, and Makah U&A, respectively. The annual average number of newly seen whales that were "recruited" (seen in a subsequent year), excluding 1998 and 2005, was 21.7, 15.3, and 4.7 for PCFA, ORSVI, Makah U&A respectively. Thus, there were a substantial number of new whales seen each year and about 45 percent of those were seen again in a subsequent year.

The plots (also known as "discovery curves") of the cumulative number of unique whales for the PCFA, ORSVI and Makah U&A (Figure 3-6) also demonstrate that this is not a closed population of whales. All of these curves continue to climb because there have been new individuals seen each year. The same pattern holds for the plots of whales that are sighted in more than one year (Figure 3-7). These latter plots are only shown for 1998-2004 because whales seen in 2005 have not had a chance to be resighted within the scope of the data. Also, latter years will appear to increase more slowly because there have been fewer opportunities for resighting whales that were first seen in one of the later years (a whale first seen in 2004 has only had one year, 2005, in which to be resighted).

TABLE 3-2. CLASSIFICATION OF WHALES SEEN WITHIN THE PCFA (NORTHERN CALIFORNIA TO NORTHERN BRITISH COLUMBIA).

YEAR	TOTAL SEEN[2]	NEWLY SEEN[3]	NEWLY SEEN & SEEN AGAIN[4]
1998	129	129	103
1999	152	75	17
2000	139	56	32
2001	174	66	25
2002	206	57	28
2003	158	22	17
2004	182	35	11
2005	142	24	-
Total		464	233

TABLE 3-3. CLASSIFICATION OF WHALES SEEN WITHIN THE ORSVI (OREGON TO SOUTHERN VANCOUVER ISLAND).

YEAR	TOTAL SEEN	NEWLY SEEN	NEWLY SEEN & SEEN AGAIN
1998	84	84	63
1999	71	26	12
2000	67	26	16
2001	127	56	17
2002	102	40	21
2003	110	26	18
2004	113	30	8
2005	101	23	-
Total		311	155

[2] "Total Seen" is the number of unique whales seen in each year
[3] "Newly seen" is the number of whales seen that year that had not been seen prior to that year (but within the 1998-2005 period).
[4] "Newly Seen & Seen Again" is the number of whales that were seen in at least one more year within the PCFA (Table 3-2) or ORSVI (Table 3-3) subsequent to the first year they were seen.

TABLE 3-4. CLASSIFICATION OF WHALES SEEN WITHIN THE MAKAH U&A (NORTHERN WASHINGTON COAST & STRAIT OF JUAN DE FUCA).

YEAR	TOTAL SEEN[5]	NEWLY SEEN[6]	NEWLY SEEN & SEEN AGAIN[7]
1998	35	35	12
1999	11	6	4
2000	14	11	7
2001	32	20	5
2002	8	1	1
2003	22	12	4
2004	22	16	7
2005	35	14	-
Total		115	40

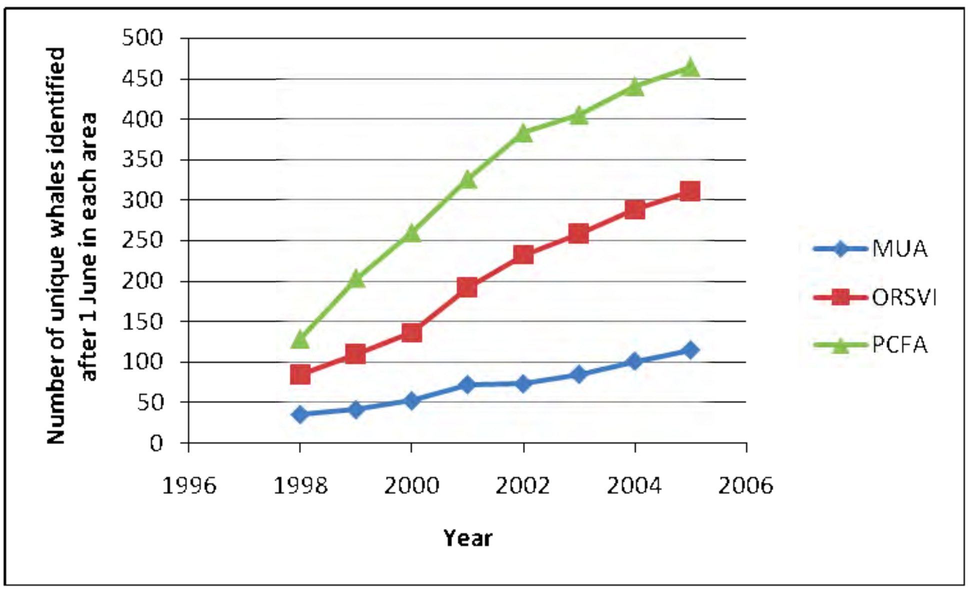


Figure 3-6. Cumulative number (i.e., "Discovery curve") of unique gray whales photo-identified in PCFA, ORSVI, and Makah U&A during 1998-2005.

[5] "Total Seen" is the number of unique whales seen in each year

[6] "Newly seen" is the number of whales seen that year that had not been seen prior to that year (but within the 1998-2005 period).

[7] "Newly Seen & Seen Again" is the number of whales that were seen in at least one more year within the Makah U&A subsequent to the first year they were seen.

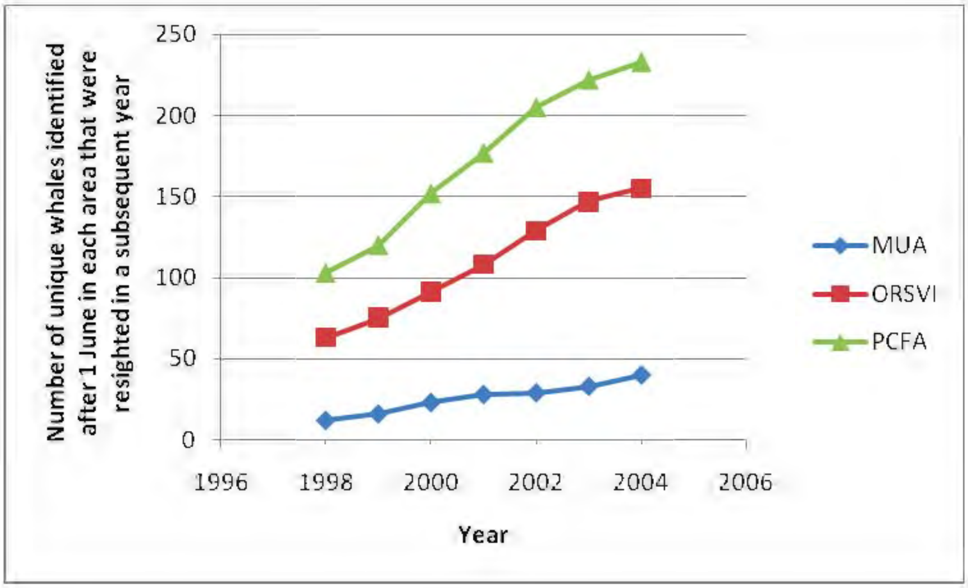


Figure 3-7. Cumulative number (i.e., "Discovery curve") of unique gray whales photo-identified in PCFA, ORSVI, and Makah U&A during 1998-2004 and resighted in a subsequent year.

Even though some whales are sighted annually or interannually returning to the southern portion of the summer range, there is no evidence that returning whales are genetically unique relative to the larger gray whale population (Swartz et al. 2006). If the gray whales in the southern portion of the summer range represented a distinct lineage of mothers, and their offspring exhibited high site fidelity (with adult males exhibiting wider dispersal and less site fidelity), this complex social structure would be reflected in differences in maternally derived genes (i.e., mtDNA) relative to the larger population. Researchers have documented such differences in mtDNA reflecting strong site fidelity for humpback whales in the North Atlantic and North Pacific in their summer feeding grounds (Baker et al. 1990; Larsen et al. 1996). The documented mtDNA differences between humpbacks in different feeding areas indicate that calves learn to use specific feeding areas from their mothers, and they subsequently pass that knowledge through the generations (a concept known as maternally directed fidelity or familial recruitment) (Palsbøll et al. 1995; Larsen et al. 1996; Palsbøll et al. 1997). Long-term resighting histories of individual humpback whales in the North Atlantic further demonstrate very high annual return rates to specific feeding grounds and minimal interchange among such regions (Clapham et al. 1993; Stevick et al. 2006).

In the case of ENP gray whales in the southern portion of their summer range, Ramakrishnan et al. (2001) analyzed the mtDNA of whales sampled in the PCFA survey area and concluded that they do not differ genetically from the larger population. These data suggest that there is not a genetically distinct group of mothers teaching their offspring to feed in the PCFA survey area. The apparent difference in site fidelity between humpback and gray whales may be due to the geographic structure of the migratory route between the summer and wintering grounds. For humpback whales, the migratory routes to isolated feeding areas are direct and often cross deep ocean basins (Baker et al. 1990; Calambokidis et al. 1996; Clapham and Mead 1999; Calambokidis et al. 2002). In contrast, gray whales follow a coastal migratory route passing all known feeding areas. Thus, even if mothers introduce calves to a feeding area, there is a natural mechanism for all gray whales to adopt and/or revisit productive feeding areas (Calambokidis et al. 2004a). Additionally, Ramakrishnan et al. (2001) observed a statistically significant male bias in the sex ratio of gray whales sampled in the PCFA survey area of 1.8 males to 1 female (with a sample of 45 animals). The male-skewed sex ratio is further evidence that the whales in the southern portion of the summer range during the summer feeding period are not demographically independent from the larger gray whale population because such a sex ratio would not likely sustain a population without external recruitment.

Using open-population models, Calambokidis et al. (2004a) demonstrated that new whales were more likely to be seen in subsequent years if they were seen for longer periods of time during their first year. They proposed that this relationship resulted from the whale's foraging success/failure, which would affect the whale's propensity to return in subsequent years. They also proposed that the annual northbound migration along the Pacific coast provided a natural mechanism for recruitment of gray whales because the whales would stop to forage and, if they were successful, would be more likely to return in subsequent years.

In summary, available data indicate there is no evidence that the gray whales in the southern portion of the summer range are genetically or demographically different from the larger population. Sighting (photo-identification) data show a continuum of gray whale distribution in the southern portion of the summer feeding range during summer and fall feeding periods from at least the southernmost survey area in northern California to Southeast Alaska near Sitka and Kodiak Island (Calambokidis et al. 2003; Calambokidis 2004a; Moore et al. 2007). Although some gray whales return to the same general feeding area in at least some later years, photo-id data have demonstrated large-scale movements of whales and variability in gray whale distribution and habitat use within season and between years. These movements and variability are likely due to shifts in prey availability, the opportunistic and diverse nature of the species' feeding ecology (Section 3.4.3.1.3, Feeding Ecology and Role in the Marine Ecosystem), and the ability of gray whales to respond rapidly to changes in prey composition and density throughout the range (Darling et al. 1998; Dunham and Duffus 2001; Moore et al. 2003; Moore 2005; Moore et al. 2007). The discovery of feeding areas along the migration route provides a natural mechanism for recruitment of new whales into the PCFA survey area (Calambokidis et al. 2004a).

3.4.3.3.2 Winter Range Distribution and Habitat Use

Gray whales occupy a large area in their winter range, (Reilly 1984). Researchers think the winter range extends along the west coast of the Baja Peninsula, as far north as Point Conception and the Channel Islands in central California (near Santa Barbara) to Cabo San Lucas (Reilly 1984; Jones and Swartz 2002; Urbán-Ramírez et al. 2003), where most investigators have concentrated their observations (Findlay and Vidal 2002). Findlay and Vidal (2002) also reported that some of the population migrates farther south, around the tip of the peninsula in the Gulf of California. A few isolated sightings of gray whales over the years have also occurred in more southern localities along the Pacific coast of mainland Mexico and at the oceanic Revillagigedo Islands (Findlay and Vidal 2002). Researchers reported two sightings around the Chilean-Peruvian coastal waters of South America, showing that gray whales can cross the equator in search of suitable feeding grounds (Yablokov and Bogoslovskaya 1984).

As in the summer range, gray whales in the winter range often aggregate in specific areas of the ocean, particularly near and within coastal lagoons and bays of Baja, including Lagunas Guerrero Negro, Ojo de Liebre (Scammon's Lagoon), San Ignacio, Bahia Magdalena, Bahia Almejas, and Santo Domingo Channel (Urbán-Ramírez et al. 2003). The whales segregate spatially and temporally, such that their distribution, gross movements, and timetable of lagoon occupation differ for each age-sex group (Jones and Swartz 1984; Urbán-Ramírez et al. 2003; Swartz et al. 2006). Females with calves concentrate within the interiors of lagoons or lagoon nurseries, and the whales shift to the lagoon inlets and coastal waters occupied by the single whales without calves (i.e., oestrus females and mature males) when those whales depart for the northward migration (Jones and Swartz 1984; Swartz et al. 2006). Although there is repeated use of some lagoons, whales move among and between lagoons and spend some amount of the winter in waters outside of lagoons (Urbán-Ramírez et al. 2003).

The aggregating behavior of the whales and their within-season movement between different areas on the wintering grounds relate to both reproductive and feeding activities, although some literature reports that whales mostly fast throughout the winter and rely on reserves of body fat to carry them through the winter period. Most of the feeding in the wintering grounds appears to be pelagic, rather than benthic, although researchers have seen mud plumes indicative of benthic feeding (Nerini 1984). Pelagic prey species include sardines, bait fish, spawning squid, and crustaceans associated with eel grass mats (Nerini 1984). Feeding areas foraging gray whales frequent, as documented by Nerini (1984), include San Ignacio Lagoon, Magdalena Bay, Punta San Juanico, and Laguna de San Quentin in Baja Mexico, and La Jolla and Point Loma, California. In addition, Yablokov and Bogoslovskaya (1984) noted two sightings of gray whales around the Chilean-Peruvian coastal waters of South America.

On a longer-term basis, evidence indicates that distribution and habitat use within the wintering range varies according to environmental conditions. As one example, Bryant et al. (1984) observed that whales apparently deserted the Laguna Guerrero Negro, the northernmost lagoon, during the late 1960s but reestablished during the 1970s, increasing steadily until an observed decline in 1982. They postulated that the whales recolonized the area after commercial shipping and dredging activities stopped in 1967, but they also noted that year-to-year fluctuations in relative abundance had previously been reported and observed that some individual whales enter lagoons in successive years whereas others return after longer intervals. Bryant et al. (1984) ultimately concluded that time would tell whether the number of whales using the lagoon was still increasing over the long term and whether the decrease in 1982 was a short-term fluctuation.

Recent studies have attributed shifts in the winter range to the El Nino-Southern Oscillation, a multi-year climatic cycle occurring irregularly in the tropical Pacific every two to seven years and lasting 6 to 18 months. When El Nino events occur, driven by low atmospheric pressure between Tahiti and Australia, sea surface temperatures warm, and biological productivity drops near Baja. Whales shift farther north in their distribution, such as during the 1998 wintering season. When El Ninos subside (and La Ninas occur), the sea surface temperatures are cooler near Baja (e.g., the 1989 and 1999 calving seasons), the biological productivity is higher, and whales shift south in their distribution (Gardner and Chávez-Rosales 2000; Urbán-Ramírez et al. 1990; Sánchez-Pacheco et al. 2001; Urbán-Ramírez et al. 2003). The observation of this shift led Gardner and Chávez-Rosales (2000) to conclude that environmental conditions may be more important factors in determining breeding locations than site fidelity.

Section 3.4.3.1.4 (Seasonal Migrations) describes the timing and characteristics of the ENP gray whales' southward and northward migrations, and Section 3.4.3.3 (Distribution and Habitat Use) describes the use of the southern portion of the summer range by whales that do not make the entire northward migration. Of particular interest for this EIS are whales identified during the summer feeding period (June 1 through November 30) in the Makah U&A (northern Washington coast and Strait of Juan de Fuca), ORSVI and PCFA survey areas. The number of these identified whales is a small fraction (less than 1 percent) of the total ENP gray whale population, almost all of which migrates through these survey areas on the northward migration. If these identified whales are randomly mixed in the population during the migration period (December 1 through May 30), less than one percent of the encounters between whales and Makah hunters during that time would be with one of these identified whales. Available information suggests this percentage would be greater than suggested based on random mixing and depends on the sighting location within the Makah U&A.

The photo identifications from 1998 to 2005 demonstrate a strong difference in the expected probability that a whale sighted within the northern Washington coast is part of the PCFA compared with a whale sighted within the Strait of Juan de Fuca survey areas (Table 3-5). A total of 67 unique whales were seen in the Makah U&A before June 1 during 1998 to 2005 (most in May 1999). Those seen off the northern Washington coast were less likely to be seen after June 1 in the Makah U&A or elsewhere in the PCFA survey area than those that were seen before June 1 in the Strait of Juan de Fuca. One whale was identified before June 1 in both areas, as reflected in the total.

Only 17.9 percent (10 of 56) of the whales identified in the northern Washington coast survey area prior to June 1 were seen in the PCFA in one or more years from 1998-2005. In comparison, 91.7 percent (11 of 12) of the whales seen prior to 1 June in the Strait of Juan de Fuca were also seen somewhere in the PCFA after 1 June during 1998-2005. If harvesting occurred in the northern Washington coast area from Dec 1 through May 31, 17.9 percent, 17.9 percent, and 12.5 percent of whales harvested could have been expected to be later seen between June 1 and November 30 in the PCFA, ORSVI, and Makah U&A, respectively (the percentages are the same for PCFA and ORSVI because zero whales were seen outside the ORSVI).

TABLE 3-5. UNIQUELY IDENTIFIED WHALE SIGHTINGS IN THE PCFA

	Seen before 1 June in:		
After 1 June 1998-2005	**Northern Washington Coast**	**Strait of Juan de Fuca**	**Total**
Not seen after 1 June in PCFA	46	1	47
Seen after 1 June in Makah U&A	7	5	11
Seen after 1 June in ORSVI outside Makah U&A	3	3	6
Seen after 1 June in PCFA outside ORSVI	0	3	3
Total	56	12	67

3.4.3.4 Current Status of the Gray Whale Population

3.4.3.4.1 Abundance Data

NMFS' National Marine Mammal Laboratory (NMML) estimates gray whale population size based on systematic shore-based surveys conducted during the whales' southbound migration. Since 1967, NMML has conducted shore-based counts of southbound gray whales near Carmel, at either Yankee Point or Granite Canyon stations (Rugh et al. 1999; Buckland and Breiwick 2002; Rugh et al. 2005, Rugh et al. 2008). NMML selected these observation areas because the continental shelf and the corresponding gray whale migratory corridor are relatively narrow. Few whales migrate beyond the visual range of observers on shore. Aerial surveys showed that 96 percent of southbound gray whales pass within 3 miles of the shore (Sund and O'Connor 1974), and fewer than 2 percent of the whales migrate beyond the sighting range of observers (Shelden and Laake 2002). These methods and data have been reviewed and accepted by the IWC, the internationally recognized authority on large cetacean management.

Single observers conduct the southbound counts by working in three-hour shifts throughout daylight hours, from mid-December to mid or late-February (Rugh et al. 2005; Rugh et al. 2008). The observers work independently, scanning the viewing area using binoculars with reticles (vertical marks in the optics) and magnetic compasses to track whale groups as they migrate past the station. When observers spot gray whales, they hand-record the following data: (1) time of sighting, (2) horizontal bearing, (3) vertical angle, (4) pod size estimate, (5) calf sightings, (6) environmental conditions, and (7) any unusual behaviors (Rugh et al. 2005; Rugh et al. 2008). The horizontal bearing and vertical angle allow for estimates of distance from shore. On most days during January, when whale counts are at their highest, paired, independent searches are conducted by having a second observer conduct counts nearby (in the same viewing area), but out of sight of the primary observer (i.e., the observers are stationed in separate observation sheds). These independent searches provide a test of the repeatability of the census effort. More detail about survey protocol is in Rugh et al. (1993), Shelden et al. (2004), Rugh et al. (2005), and Rugh et al. (2008).

Data are entered on a computer at the end of each day and field-checked. Following further quality reviews of the database, researchers compare sighting locations and counts of paired observers to establish the probability of missing whales within the viewing area. In the abundance analysis, correction factors are applied to data to account for (1) whales that passed during periods when observers were not present (before and after the census season, at night, or when visibility was poor); (2) whales within the viewing range of observers that were missed (i.e., one observer saw a whale, but the other did not); (3) differential sightability by observer, pod size, distance offshore, and various environmental conditions; (4) errors in pod size estimation; (5) covariance within the corrections due to variable sightability by pod size; and (6) differential travel rates between day and nighttime travel (Hobbs et al. 2004; Rugh et al. 2005, Rugh et al. 2008). Rugh et al. (2005) adjusted the correction factor for nighttime travel from 1.020 (SE equals 0.023) based on radio-tagged whales (Swartz et al. 1987) to 1.0875 (SE equals 0.0363), based on Perryman et al. (1999) where thermal imagery provided quantifiable evidence that whales pass the shore at a higher rate at nighttime.

Table 3-6 lists abundance estimates of the gray whale population based on the NMFS counts of the southbound migration (Rugh et al. 2008). Population estimates are always subject to a certain level of variability, and this is represented by the confidence interval, a range of values that is relatively certain (95 percent) to include the true population size. Even though researchers provide point estimates, the confidence interval is a better representation for the estimates of abundance and their precision. For example, the point estimate of the most recent abundance was 20,110 whales, but NMFS can only be relatively certain that the true abundance in 2006/2007 was probably somewhere between 17,000 and 24,000 whales (using rounded figures for the 95 percent confidence interval).

TABLE 3-6. GRAY WHALE POPULATION ESTIMATES FROM 1967 TO 2002

YEAR	POPULATION ESTIMATE	CONFIDENCE INTERVAL
1967/1968	13,776	11,814 to 16,064
1968/1969	12,869	11,555 to 14,333
1969/1970	13,431	12,026 to 15,000
1970/1971	11,416	10,317 to 12,633
1971/1972	10,406	9,271 to 11,681
1972/1973	16,098	14,545 to 17,817
1973/1974	15,960	14,341 to 17,761
1974/1975	13,812	12,365 to 15,428
1975/1976	15,481	13,765 to 17,411
1976/1977	16,317	14,792 to 17,999
1977/1978	17,996	15,710 to 20,615
1978/1979	13,971	12,571 to 15,527
1979/1980	17,447	15,622 to 19,485
1984/1985	22,862	20,316 to 25,727
1985/1986	21,444	19,360 to 23,752
1987/1988	22,250	21,485 to 26,954
1992/1993	18,844	16,651 to 21,326
1993/1994	24,638	21,911 to 27,704
1995/1996	24,065	21,485 to 26,954
1997/1998	29,758	24,241 to 36,530
2000/2001	19,448	16,097 to 23,496
2001/2002	18,178	15,011 to 22,013
2006/2007	20,110	16,936 to 23,879

Sources: Rugh et al. (2005) and Rugh et al. (2008)

Gray whale population estimates rely on the assumptions that all whales migrate as far south as Carmel when observers are studying the southward migration and that most whales will pass offshore within view of the observers. As discussed below in more detail, it has not been demonstrated that the entire gray whale population migrates past Carmel every year (Laake et al. 1994; Rugh et al. 2005), illustrating the importance of obtaining a long time-series of estimates across years from which to determine the trend in population size (Laake et al. 1994; Rugh et al. 2005). Observers conducted the last southbound count in 2006/2007.

3.4.3.4.2 Stranding Data

A stranding is an event where a marine mammal is dead on a beach or in the shallow water, or a marine mammal is alive on a beach or in shallow water, but is unable to return to its natural habitat without assistance (50 CFR 216.3). In the 1992 MMPA Amendments, Congress designated NMFS as the lead agency to coordinate a Marine Mammal Health and Stranding Response Program. Through the Marine Mammal Stranding Network, NMFS oversees, coordinates, and authorizes volunteers from non-profit organizations, aquaria, universities, and state and local governments to respond to marine mammal strandings throughout the coastal states. The NMFS Marine Mammal Health and Stranding Response Team also coordinates with partners in neighboring countries when strandings cross national lines. Stranding network volunteers collect and report stranding data to NMFS, and the agency maintains a database.

Annual gray whale stranding data from Alaska to Mexico for the years 1995 to 2005 are in Table 3-7 and Figure 3-8. The number of gray whale strandings along the west coast of North America averaged 41 animals from 1995 to 1998. Stranding detection effort during these times was not directed; reports were compiled from opportunistic reports that were later relayed to NMFS' regional stranding coordinators (Gulland et al. 2005). In 1999 and 2000, gray whales stranded dead, or moribund, in unprecedented numbers from Alaska to Baja California Sur, Mexico, with the highest numbers reported in Mexico and Alaska (Norman et al. 2000; Gulland et al. 2005). For comparison, 29 dead gray whales were found on the Alaska coast in 1989 during surveys associated with assessment of impacts caused by the *Exxon Valdez* oil spill (Loughlin 1994). The 1999 and 2000 strandings and the subsequent return to normal conditions from 2002 through 2005 are discussed in detail below.

TABLE 3-7. SUMMARY OF ENP GRAY WHALE STRANDING DATA FROM ALASKA TO MEXICO, 1995 TO 2006

REGION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Alaska	1	0	3	3	73	55	5	0	5[1]	0	5[2]	NA
Canada	2	0	5	2	10	22	0	0	2	2	2	NA
Washington	7	2	3	4	28	23	1	2	3	2	11	8
Oregon	4	3	3	0	3	2	0	3	2	4	5	4
California	12	13	10	30	45	59	5	7	8	17	7	NA
Mexico	13	3	22	17	124	207	10	15	NA	2	12	NA
Total	**39**	**21**	**46**	**56**	**283**	**368**	**21**	**27**	**-**	**27**	**42**	**-**

NA – not available.
[1] One of these five reported strandings was unconfirmed.
[2] One of these five reported strandings was unconfirmed.
Source: Gulland et al. 2005; National Marine Mammal Stranding Response Program 2007

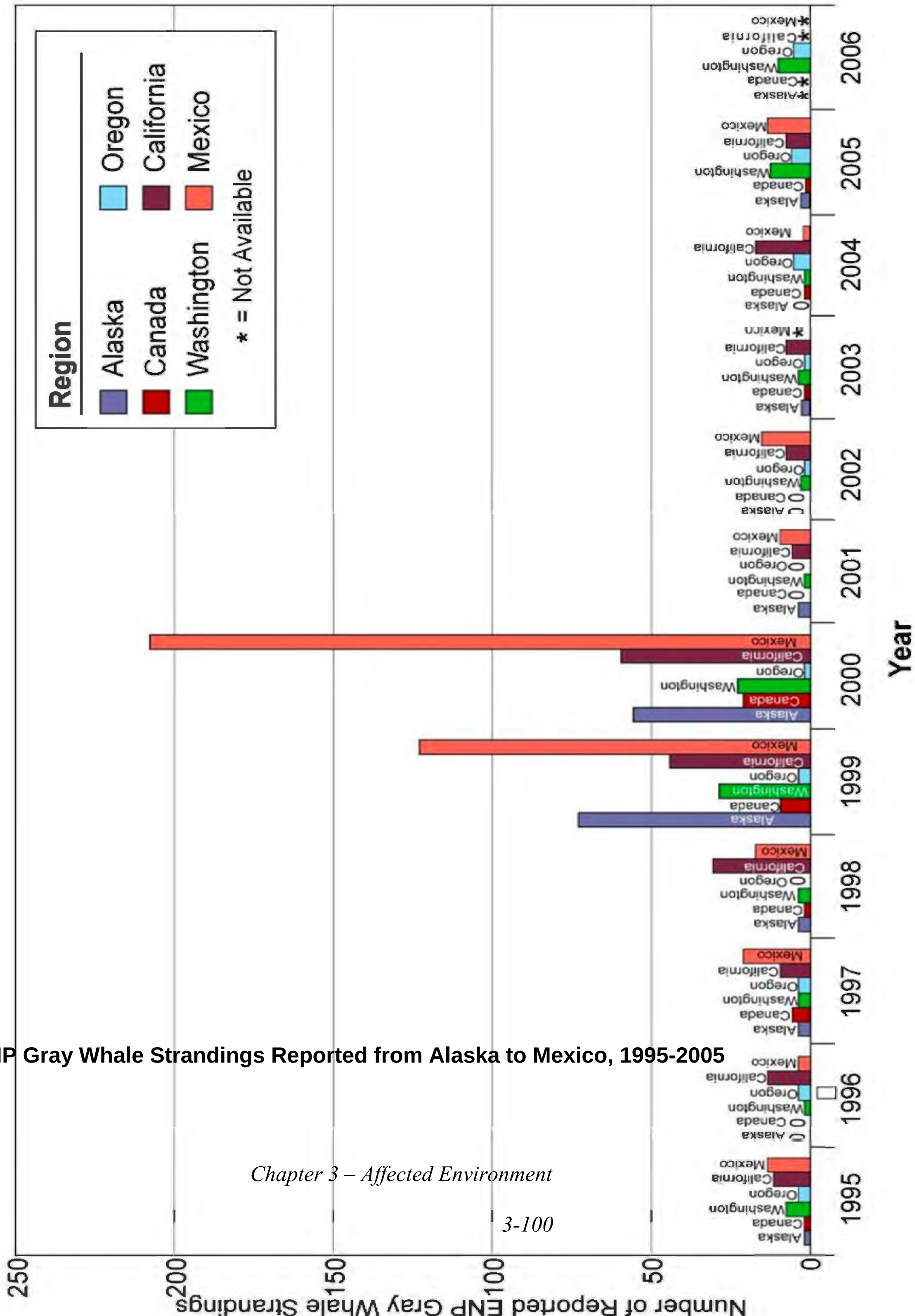


Figure 3-8. ENP Gray Whale Strandings Reported from Alaska to Mexico, 1995-2005

In 1999, the number of gray whale strandings documented along the west coast of North America increased to approximately 7 times the annual mean (41) reported between 1995 and 1998 (Gulland et al. 2005; Table 3-7). NMFS consulted the Working Group on Marine Mammal Unusual Mortality Events (Working Group) in July 1999, due to the unusually high number (283 whales) of stranded whales in 1999 (Gulland et al. 2005). The Working Group is an advisory board created under Section 404 of the MMPA, comprised of 12 members with expertise in marine science, including conservation and veterinary science, whose expertise is consulted when marine mammals are dying in an unusual way.

The Working Group weighed the 1999 stranding evidence against the following seven criteria developed to determine whether a stranding event is unusual:

1. A marked increase occurs in the magnitude of strandings when compared with prior records.
2. Animals strand at a time of the year when strandings are unusual.
3. An increase in strandings occurs in a localized area (possibly suggesting a localized problem), occurs throughout the geographical range of the species/population, or spreads geographically with time.
4. The species, age, or sex composition of the stranded animals differs from that of animals that normally strand in the area at that time of the year.
5. Stranded animals exhibit similar or unusual pathologic findings or the general physical condition (e.g., blubber thickness) of stranded animals is different from that normally seen.
6. Mortality accompanies unusual behavior patterns observed among living individuals in the wild, such as occurrence in habitats normally avoided or abnormal patterns of swimming and diving.
7. Critically endangered species are stranding. Stranding of three or four right whales, for example, may be cause for great concern, whereas stranding of a similar number of fin whales may not.

A single criterion or a combination of criteria may indicate the occurrence of an unusual mortality event.

The Working Group concluded that the 1999 stranding event was an unusual mortality event because the animals were stranding throughout their range, stranding rates had increased precipitously, animal behavior and body condition were different from those reported previously (emaciated), and animals were stranding in areas where such events had not been historically noted (behavioral change) (Gulland et al. 2005). The Working Group recommended increasing evaluations and examinations of carcasses, providing a small team to summarize the available information for the working group, and coordinating and exchanging information between the four countries in which the gray whale stock occurs (Mexico, the United States, Canada, and Russia) (Gulland et al. 2005).

After the 1999 mortality event was declared unusual, coordination between the stranding networks increased; two workshops were held in Mexico to enhance coordination (LaPax March 2000 and Guerrero Negro March 2001) (Gulland et al. 2005). Stranding detection effort varied significantly, both geographically and temporally; because of the high stranding report rates, an increased emphasis on timely reporting started in April 1999 and continued through 2002 to allow for real-time analysis of trends (Gulland et al. 2005). NMFS prepared a provisional report for the Working Group in 2000 (Norman et al. 2000), and preliminary findings were presented to the Scientific Committee of the IWC (Pérez-Cortés Moreno et al. 1999). In 2000, the number of stranded animals remained high, with 368 carcasses reported, representing a nine-fold increase from the 1995 to 1998 average (Gulland et al. 2005). At the annual Working Group meeting in March 2001, the Working Group recommended keeping the unusual mortality event open for monitoring, but when only 20 strandings had occurred by October 2001, they recommended closing the event (NMFS 2001b). Based on this information, NMFS closed the event (NMFS 2001b).

NMFS examined and synthesized stranding network information for 1999 and 2000 in Gulland et al. (2005). The authors observed that most of the strandings in 1999 and 2000 occurred in Mexican waters during the winter season. Researchers consistently surveyed stranding effort in the wintering lagoons of Mexico, and the effort in 1999 and 2000 was comparable with that of previous years, except that records of gray whales that stranded outside their normal winter range were obtained opportunistically (Gulland et al. 2005). Increases in all regions, except Oregon, were significant. Fairly consistent stranding detection and reporting in California, Oregon, and Washington (except for remote areas of the Olympic Peninsula) took place from 1995 to 2002. Effort in British Columbia was opportunistic, due to the complex coastline. Detection effort and geographic coverage in Alaska differed significantly from year to year, but dedicated surveys were conducted in some areas of the Alaska coast from 1999 to 2001 (Gulland et al. 2005).

Although each stranding was examined as thoroughly as was practical, only 3 (0.5 percent) of the 651 animals that stranded in 1999 and 2000 were examined thoroughly enough to determine the cause of death (including detection of pre-existing conditions). One whale was diagnosed with a viral infection not previously reported in stranded whales (equine encephalitis), one whale had an unusually intense infection of parasites normally associated with baleen whales, and one whale was intoxicated with domoic acid (Section 3.4.3.6.3, Harmful Algal Blooms). Researchers considered several factors as possible causes for the high number of gray whale strandings reported in 1999 and 2000. Factors include starvation, chemical contaminants (see Environmental Contaminants below), biotoxins (see Harmful Algal Blooms below), disease, parasites, fisheries interactions and ship strikes, variability in detection effort and reporting, and effects of winds and currents on carcass decomposition (Norman et al. 2000; Gulland et al. 2005). The emaciated condition of the stranded whales, combined with evidence of low lipid concentrations and organochlorines in the stranded animals (Krahn et al. 2001) and decreases in calf production in the population during the same time frame (Perryman et al. 2002), led many scientists to conclude that starvation was the most likely cause of mortality. Some of the animals that stranded were in good to fair nutritional condition, suggesting that not all of the strandings link logically to food resource limitation and starvation (Gulland et al. 2005).

The cause of such large-scale starvation remains unknown (Gulland et al. 2005). Some scientists think that the starvation was related to a climatically based decline in prey availability, especially related to the 1997 and 1998 El Nino events in the winter range and the Pacific Decadal Oscillation and Arctic Oscillation in the summer range (LeBouef et al. 2000; Moore et al. 2001; Moore et al. 2003). Section 3.4.3.3, Distribution and Habitat Use, discusses oceanic climatic events throughout the gray whale range. Perryman et al. (2002) also showed that seasonal changes in ice distribution in the Bering and Chukchi Seas might influence the duration of whale feeding. Because gray whales feed opportunistically on a broad suite of prey species throughout their range and move to alternate areas when the food runs out (Section 3.4.3.1.3, Feeding Ecology and Role in the Marine Ecosystem), these explanations seemed simplistic (Nerini 1984; Moore et al. 2001; Moore et al. 2003; Moore 2005; Moore et al. 2007). Others postulated that the starvation related to density-dependent population effects—animals approaching K experience heightened competition for food resources and decreased reproductive success (Section 3.4.3.4.5, Estimates of Carrying Capacity (K), OSP, and PBR). This explanation for the starvation is imperfect, given the suddenness of the demographic change and the relatively larger amounts of adult whales that stranded (Moore et al. 2001). Gulland et al. (2005) suggested that the starvation was probably a result of both density dependence and environmental variability; populations of cetaceans that are at or near K probably are more vulnerable to environmental variability due to nutritional stress.

Recently, researchers investigating one of the main calving-breeding lagoons in Mexico have noted large numbers of whales that are "skinny" in appearance, suggesting malnourishment (Swartz et al. 2007; Urban-Ramirez and Swartz 2007; Urban-Ramirez et al. 2007). Photographic data collected during 2007 in Laguna San Ignacio indicated that 11 to 13 percent of the whales photographed exhibited obvious signs of malnutrition and/or disease, including noticeable depressions in the head region, sub-dermal protrusions of bony parts (e.g., the scapula), and concave rather than convex profiles to whale dorsal flank areas (Swartz et al. 2007). Urban-Ramirez and Swartz (2007) noted other studies where some "skinny" whales that were pregnant returned to their summer feeding areas with apparently healthy calves, suggesting that "skinniness" may not be a fatal condition but instead reflect "a tolerable reduction [in] nutritional resources." Researchers from NMFS and other institutions plan to continue photographing and monitoring the condition and health of gray whales as part of the Laguna San Ignacio Ecosystem Science Program (Urban-Ramirez et al. 2007).

Since the 1999 and 2000 stranding events, stranding levels have returned to the normal range, decreasing to 21 and 26 whales in 2001 and 2002, respectively. Most of the 2002 to 2005 dead whales that biologists examined died of unknown causes. In a few cases, biologists found evidence of ship strikes (propeller cuts) or entanglement in fishing gear (Gulland et al. 2005).

3.4.3.4.3 Calf Production Data

Gray whale calf production trends have been monitored using three methods. They are presented below:

1. Surveying for calves from shore and from aircraft in central California during the northward migration (Perryman et al. 2002; Perryman et al. 2004)
2. Counting calves from shore at Granite Canyon, California during the southward migration (Shelden et al. 1995; Shelden and Rugh 2001; Shelden et al. 2004)
3. Conducting aerial and vessel surveys for calves in the lagoons of Baja California (Urbán-Ramírez et al. 2003)

NMFS' Southwest Fisheries Science Center conducted shore-based sighting surveys of northward migrating whales from 1994 to 2005 to estimate the number of calves passing Piedras Blancas, California (Perryman et al. 2002; Perryman 2005). Additional research included (1) aerial surveys to determine offshore distribution 1994 and 1995; and (2) concurrent replicate watches near the peak of each migration to estimate sightings missed by the standard watch team. Data from these surveys, including calf counts, corrected calf estimates (to account for periods not on watch and for calves missed), and calf production indices (calf estimate/total population estimate) are summarized in Table 3-7 and illustrated in Figure 3-9.

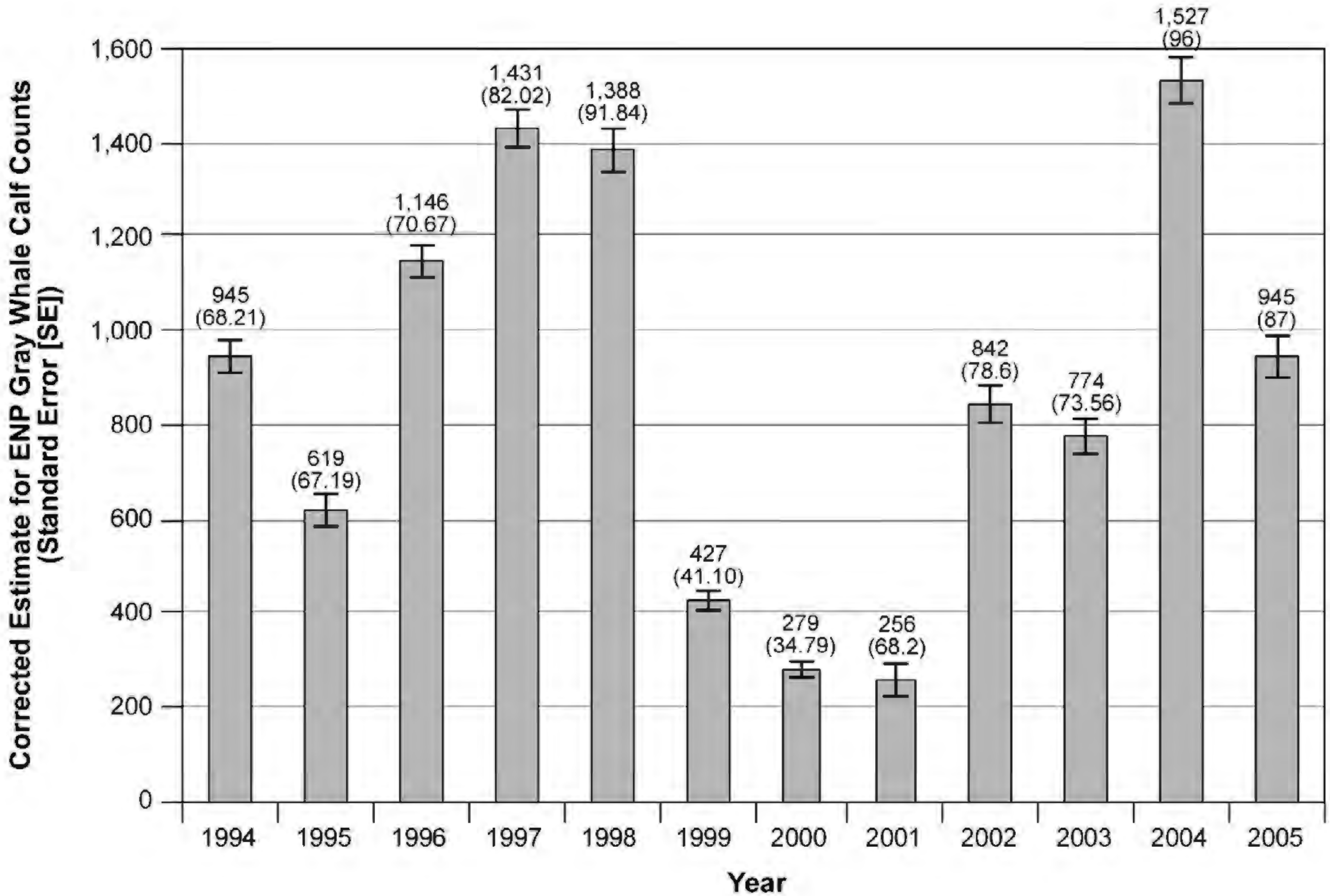


Figure 3-9. ENP Gray Whale Calf Counts in California, 1994-2005

The calf estimates and calf production index indicate that the gray whale population experienced a period of decreased production from 1999 to 2001. It is apparent that, although calf production dipped from 1999 to 2001, it seems to have recovered by 2002 (Table 3-8). Fluctuations in calf production over this period positively correlated with the length of time that primary feeding habitat was free of pack ice during the previous year (Perryman et al. 2002; Perryman et al. 2004). Additional evidence of changes in calf production comes from observations at the Mexican calving lagoons. Estimates of annual calf production in the lagoons (1997 to 2002) suggest a decrease in calf production from the 1997 high (910 calves) to a low of 286 calves in 1999, followed by a gradual increase to 670 calves in 2002 (Urbán-Ramírez et al. 2002). Production has returned to normal, and one of the highest recorded counts occurred in 2004.

3.4.3.4.4 Population Dynamics and Trends

The ENP gray whale population recovered from as low as 3,000 to 5,000 whales post exploitation to over 20,000 whales today (Rugh et al. 2005; Rugh et al. 2008). From 1968 to 1998, the gray whale population increased by about 2.6 percent per year (Rugh et al. 2005). However, the most recent estimates indicate substantial declines from the peak abundance in 1997/1998 (Table 3-8). NMML analyzed the 2000/2001 and 2001/2002 southbound count data to determine whether the population size had truly decreased or whether there was an inaccuracy in the abundance estimates.

TABLE 3-8. SUMMARY OF ENP GRAY WHALE CALF COUNTS IN CALIFORNIA, 1994 TO 2005

YEAR	CALF COUNTS[1]	CORRECTED ESTIMATE (STANDARD ERROR)	CALF PRODUCTION INDEX (%)
1994	325	945 (68.21)	4.0
1995	194	619 (67.19)	2.7
1996	407	1,146 (70.67)	5.1
1997	501	1,431 (82.02)	6.8
1998	440	1,388 (91.84)	5.0
1999	141	427 (41.10)	1.6
2000	96	279 (34.79)	1.0
2001	87	256 (68.2)	1.4
2002	302	842 (78.6)	4.8
2003	269	774 (73.56)	4.1
2004	456	1,527 (96)	8.1
2005	345	945 (87)	5.0

1 Calf counts are corrected calf estimates and calf production index (calf estimate/total population estimate) for northbound migrating gray whale calves. Note: With the exception of data from 1994 to 2001, these estimates are preliminary data, and they should not be cited without the permission of W. Perryman, NMFS' Southwest Fisheries Science Center.

N.B.: The calf estimates and calf production index indicate that the gray whale population experienced a period of decreased production from 1999 to 2001.

Source: Perryman et al. 2002; Perryman 2005

The study indicated that visibility, offshore distribution of whales, and changes in observer performance were not likely explanations for the decline (Rugh et al. 2005). Rugh et al. (2005) proposed that the low counts in 2000/2001 and 2001/2002 could be due to a true drop in population size, and/or a change in the proportion of the southward migration that moves as far south as Granite Canyon (Section 3.4.3.1.4, Seasonal Migrations, Fall/Winter – Southward Migration). The number of mortalities recorded in the 1999 and 2000 stranding events did not exceed expected levels of natural mortality (Moore et al. 2000), but the stranding events are evidence of a true decline. The 1999 and 2000 unusual mortality events, and their possible cause, are discussed above in Stranding Data (with links to the Calf Production Data section and information about body condition). Current data indicate that the gray whale population is at or near its K; estimates of K and PBR are reported below.

3.4.3.4.5 Estimates of Carrying Capacity (K), OSP, and PBR

In 1994, Wade reported values of K and MNPL for the ENP gray whale stock based on then-current abundance estimates reported between 1967/1968 and 1993/1994. He estimated that the ENP gray whale population was at 51 to 97 percent of its K and that the rate of net production at the MNPL was 0.033 (95 percent confidence interval from 0.023 to 0.044) (Wade 1994). The IWC Scientific Committee discussed Wade's (1994) analysis at the 1994 IWC Scientific Committee meeting and proposed that the analysis may have been unduly influenced by the low abundance estimates in the 1992/1993 census, which likely caused the variance of the abundance estimate to be underestimated (i.e., negatively biased). Therefore, Wade (2002) incorporated an additional variance factor when he added the 1995/1996 census data to the K and MNPL analysis; the factor accounted for unexplained variation in the abundance estimate time series data. He also used an age and sex structured model. Later, Wade and Perryman (2002) incorporated the census data from 1997/1998, 2000/2001, and 2001/2002, as well as the calf production data from the northward migration (1994 to 2001), into a more complete analysis to increase the precision of the K estimate. They used a generalized logistic model, which included the added variance of Wade (2002) in the analysis. Based on these data, Wade and Perryman (2002) estimated that the K was 22,000 whales (confidence of 95 percent and confidence intervals ranging from 19,000 to 35,000 whales), and they concluded that the population was at or near carrying capacity. The most accurate abundance estimates for the ENP gray whale population between 1967/1968 and 2006/2007 (i.e., added nighttime correction factors, etc.) come from Rugh et al. (2008) who recently estimated a K of 23,686 whales (Figure 3-10).

In a recent stock assessment (Angliss and Outlaw 2008) NMFS reported that the assessments by Wade (2002) and Wade and Perryman (2002) support a conclusion that the Eastern North Pacific gray whale stock is within the OSP level (i.e., there is essentially zero probability that the population is below the stock's maximum net population level). Similar results are reported in an assessment by Punt et al. (2004). The Scientific Committee of the International Whaling Commission reviewed both assessments and agreed that management advice could be formulated from the results. Both assessments indicated that the population was above the maximum sustainable yield level, and was likely close to or above its unexploited equilibrium level (IWC 2002).

Even though the stock is within OSP, abundance will rise and fall as the population adjusts to natural and human-caused factors affecting the carrying capacity of the environment (Rugh et al. 2005, Rugh et al. 2008). In fact, it is expected that a population close to or at the carrying capacity of the environment will be more susceptible to fluctuations in the environment (Moore et al. 2001). The recent correlation between gray whale calf production and environmental conditions in the Bering Sea (Perryman et al. 2002) may be an example of this. For this reason, it can be predicted that the population will undergo fluctuations in the future that may be similar to the two-year event that occurred in 1999-2000 (Norman et al. 2000; Pérez-Cortés et al. 1999; Brownell et al. 2001; Gulland et al. 2005).

For all marine mammal stocks, NMFS prepares stock assessment reports, which include a calculation of the PBR for the stock and an assessment of whether all human-caused mortality exceeds PBR. If total average mortality remains below PBR, a stock at OSP will remain there, and any stock below OSP will continue to grow and will achieve OSP (Wade and Angliss 1997; Wade 1998). As long as the mortality average over the three-year period is less than PBR, it is considered sustainable within the framework of the PBR management strategy (Wade and Angliss 1997). Angliss and Outlaw (2005) reported that PBR for gray whales is 417 whales based on a minimum population size (N_{min}) of 17,752 whales derived from the mean of the 2000/2001 and 2001/2002 population estimates and the estimated R_{max} (maximum theoretical or estimated net productivity rate of the stock at a small population size of 0.047 multiplied by 0.5, or 0.0235) and a recovery factor of 1.0 (calculated thus: 17,752 x 0.0235 x 1.0 = 417). The annual averaged human-caused mortality and serious injury between 1999 and 2003 was 130.4 gray whales, which is considerably below the current PBR (417 whales) (Angliss and Outlaw 2005).

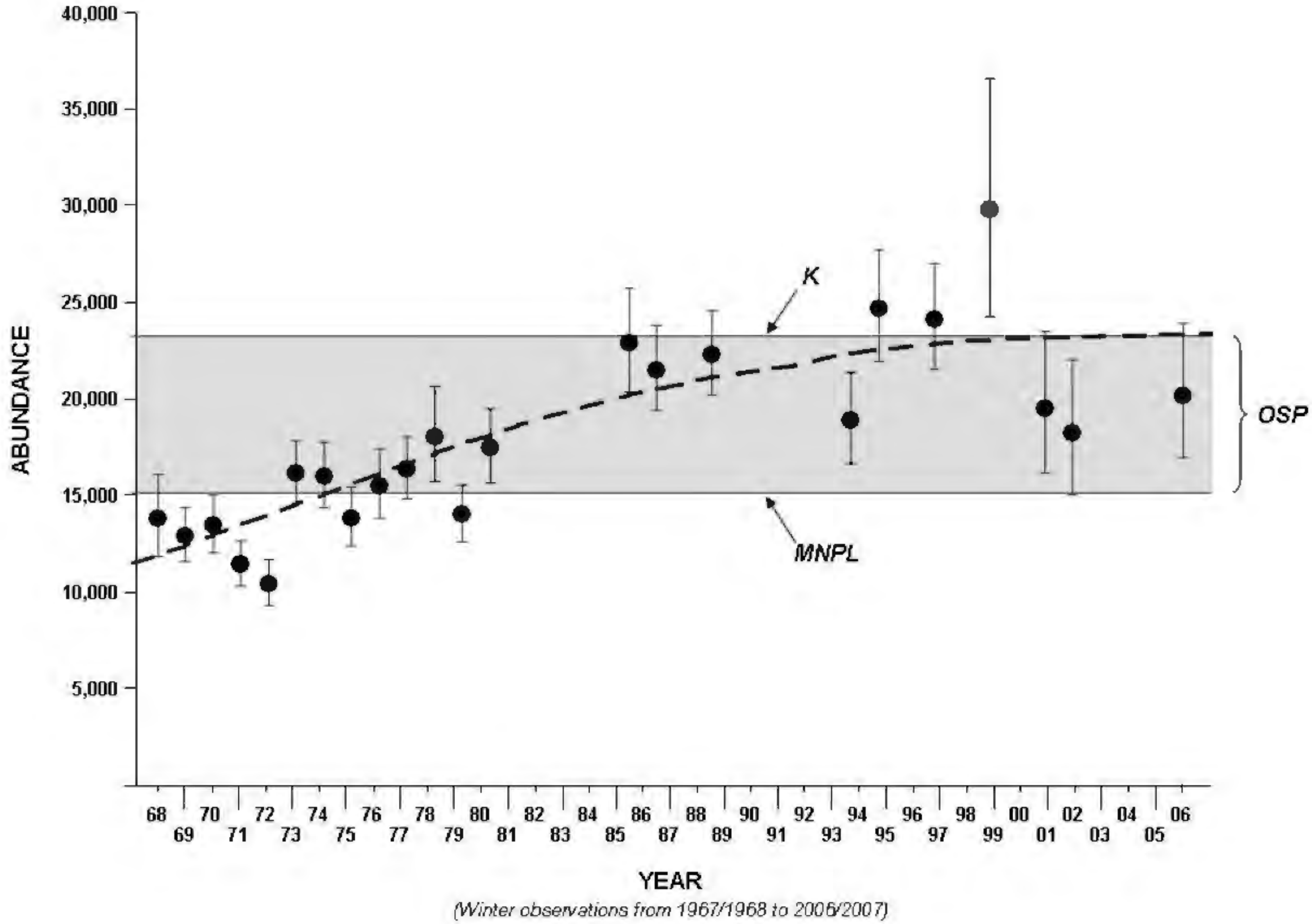


Figure 3-10. Trajectory of ENP Gray Whale Population Size

The average includes mortality associated with the Chukotka Native aboriginal harvest (122 whales), commercial fisheries (7 whales), and ship strikes (1 whale). The mortality is also considerably lower than the 463 whales per year that the IWC Scientific Committee considered a sustainable take for at least the medium term (approximately 30 years) when it conducted the last full stock assessment of ENP gray whales in 2002 (IWC 2003). The Scientific Committee concluded that that level of take is "likely to allow the population to remain above maximum sustained yield level" (IWC 2003).

3.4.3.5 Welfare of Individual Whales

The MMPA and WCA provisions discussed in Section 3.4.2, Regulatory Overview, describe considerations relevant to the welfare of individual whales in an aboriginal subsistence hunt. Any permit issued by NMFS under the MMPA must include a finding that the taking is humane, defined as inflicting the least possible degree of pain and suffering practicable (16 USC 1362(4); 50 CFR 216.3). The IWC has focused on reducing the length of time to death of a whale (i.e., reducing the amount of time between the strike and the death of a whale) to improve the humaneness of whaling (IWC 2004c; IWC 2007a). The IWC definition of humane killing is "[d]eath brought about without pain, stress, or stress, or distress perceptible to the animal. . . . Any humane killing technique aims first to render an animal insensitive to pain as swiftly as technically possible. In practice this cannot be instantaneous in a scientific sense" (IWC Resolution 2004-3). Aboriginal subsistence whalers are urged to do everything possible to reduce any avoidable suffering caused to whales in hunts (IWC Resolution 1997-1), and governments are encouraged to provide appropriate technical assistance (IWC Resolution 1999-1). The IWC criteria for determining the time to death and insensibility in hunted whales in the field are as follows: (1) relaxed lower jaw; (2) no flipper movement; or (3) sinking without active movement.

Pain has been defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (International Association for the Study of Pain 1979). Researchers have proposed assessing pain in animals by measuring physiological changes (such as pulse rate, blood pressure, or blood cortisol levels, etc.) and behavioral indicators (such as vocalization, avoidance, shaking, etc.) (Keefe et al. 1991).

Any hunting under the WCA must not be conducted in a wasteful manner. Two issues relevant to humaneness are also relevant to wastefulness: killing only as many whales as are needed for subsistence and subsistence uses (50 CFR 216.3), and ensuring that hunters quickly kill and land struck whales, rather than striking and losing them. The concept of waste includes issues beyond welfare of individual whales, such as ensuring that hunters quickly tow killed whales to shore and butcher them rapidly to avoid spoilage. Factors relevant to the MMPA and WCA considerations include the response of individual whales to pursuit and the response of individual whales to the hunter's strike. These responses will be affected by the method of the hunt, the behavior of the whale species hunted, the behavior of the people associated with the hunt (including hunters, protesters, media, and law enforcement), and the prevailing weather and sea conditions.

3.4.3.5.1 <u>Review of Hunting Methods</u>

The method of the hunt includes total whaling operations and practices, including vessels and weapons. Primary weapons are those used initially to strike and secure the whale. Some primary weapons are also capable of killing the whale. If the primary weapon does not also kill the whale, a secondary weapon is used. The secondary weapon may be the same as the primary weapon, but used additional times. Hunting weapons are also discussed in conjunction with public safety in Section 3.15.3.5.2, Weapons Associated with the Hunt. This section discusses weapons in conjunction with the welfare of individual whales.

The Makah Tribe's proposed action includes hunting whales using a traditional wood canoe (with harpooner) accompanied by a motorized chase boat (with a rifleman and an observer). Because the speed of a swimming whale exceeds that of a paddled canoe, the Makah whalers would most likely position the canoe in the path of a swimming whale at a spot where the whale is expected to surface. After a Makah hunter struck a whale with the hand-thrown toggle point harpoon attached to a line and floats, a rifleman in the chase vessel would kill the whale by using a .50 caliber rifle aimed at the central nervous system (Section 3.15.3.5.2, Weapons Associated with the Hunt).

This EIS examines alternative weapons for hunting gray whales by Makah subsistence hunters. These include the use of a hand-thrown darting gun as the primary weapon for striking whales and explosive projectiles delivered by either a second darting gun or a shoulder gun as the secondary weapon for killing whales. Both the weapons proposed by the Makah Tribe and the alternative weapons examined are used in other subsistence whale hunts, as well as in commercial hunts. Information from these hunts may be relevant to assessing the impacts on the welfare of individual whales of the proposed weapons compared to alternative weapons.

Alaska Eskimos hunt bowhead whales in the Bering, Chukchi, and Beaufort Seas using hand-thrown darting guns as their primary weapons to strike whales, securing them with lines and floats. The darting gun delivers an explosive grenade, which may also kill the whale. The secondary weapon in this hunt is also an explosive grenade, delivered either by another hand-thrown darting gun or a shoulder gun. The darting gun can deliver either a black powder or a penthrite projectile. For the shoulder gun, only black powder grenade technology is currently available (Section 3.15.3.5.2, Weapons Associated with the Hunt). The Alaska Eskimo hunters have conducted hunting trials with penthrite grenades (Øen 1995) but recently reported difficulty in obtaining necessary parts (Alaska Eskimo Whaling Commission 2006; IWC 2007a) (Section 3.15.3.5.2, Weapons Associated with the Hunt). The black powder grenade remains the main weapon used (Alaska Eskimo Whaling Commission 2006).

Aboriginal subsistence hunters (Chukotka Natives) in Russia hunt gray whales using hand-thrown toggle-point harpoons to strike whales and either smaller caliber rifles (for whales up to 10 meters [32.8 feet]), hand-thrown darting guns (for whales over 10 meters [32.8 feet]), or both to kill whales (IWC 2007a). [The use of larger caliber weapons by civilian personnel was prohibited in the Russian Federation under national legislation (IWC 1997).] Chukotka Natives have experience with penthrite grenades, but their use is not widespread.

Aboriginal subsistence hunters in West Greenland use deck-mounted harpoon cannons that also deliver penthrite grenades as the weapon both for striking and killing fin whales (Greenland Home Rule Government and Greenland Hunter's Organization 2006; IWC 2007a). They also use this weapon for striking minke whales. If the whale is not killed by the first strike, they use a high caliber rifle as the killing weapon (either a 7.62 mm with full metal jacket bullets, or a .375 with round-nosed bullets). In east and west Greenland north of Disko Bay, a collective subsistence hunt occurs for minke whales in which the hunters use hand-thrown harpoons (without explosive charges) to strike the whales and a 7.62 or .375 caliber rifle as the killing weapon.

Commercial hunters in Norway use deck-mounted harpoon guns that also deliver penthrite grenades as the primary weapon for striking minke whales (Øen 2006; IWC 2007a). If the penthrite grenade does not kill the whales, hunters use rifles as a backup (secondary) killing method, including 9.3, .375, and .458 caliber rifles with full metal jacket or round nosed ammunition. The deck-mounted cannons used in the Greenland and Norwegian hunts are not comparable to the two methods examined in this EIS (the darting gun and shoulder gun). Information about the use of rifles as secondary killing weapons in these hunts, however, may be relevant to analyzing impacts of the Makah Tribe's proposed killing weapon.

3.4.3.5.2 Whale Response to Being Pursued

The Makah Tribe's proposed action includes approaching and pursuing whales using a combination of traditional and modern methods, including the use of one or two non-motorized canoes accompanied by one or more chase boats with an outboard motor (Section 2.3.3.2.5, Overview of Proposed Hunting Method). This EIS does not examine alternative vessels to be used in a hunt (Section 2.4.5, Employ Different Hunting Methods). Based on its experience during the 1999 to 2000 hunts, the Tribe's proposal estimates there could be approximately 10 approaches and 4 unsuccessful harpoon attempts for every whale struck. An unsuccessful harpoon attempt means the whale would not be struck (that is, would not have a harpoon embedded and would not show evidence of potentially lethal injury). The Tribe also estimates that the number of whales subject to approaches with no harpoon attempts in any calendar year would not exceed 140.

At the 2003 IWC Workshop on Whale Killing Methods, the United Kingdom presented a paper raising concerns that whales experience stress as a result of being pursued and can exhibit stress-related symptoms such as impaired immune defense, reduced fecundity, failure to grow, and a disease called exertional myopathy (IWC 2004c). No data were presented to support this contention, nor are there data from other activities that involve pursuit (such as whale-watching) that would quantify gray whale response to pursuit. The response of gray whales to pursuit from whale-watching vessels (and vessel presence in general, such as those accompanying any potential whale hunt) is discussed in Section 3.4.3.6.6, Vessel Interactions. No data are available specifically regarding the response of gray whales to non-motorized (human-powered) vessels, but non-motorized vessels generally are regulated, along with motorized vessels, in whale-watching regulations globally (Carlson 2004). .

3.4.3.5.3 Whale Response to Being Struck

Under the Makah proposal, the harpooner in the canoe would strike the whale with a stainless steel toggle-point harpoon with a line and floats attached (for the definition of and evidence for a strike, see Section 2.3.3.2.2, Numbers and Status of Whales Harvested [Five-Year and Annual]). The harpoon point is intended to penetrate the whale's skin (blubber), toggle open, and secure the whale. The harpoon can penetrate and successfully secure the whale in numerous locations on the whale's body, although harpoons also dislodge from whales. Whether the harpoon holds or dislodges depends on, among other factors, the force at impact, the angle of the strike, and the surface characteristics (hard underlying connective tissue, barnacles, etc.). Hunters will often use additional harpoons to attach floats to keep the whale afloat. During the 1999 hunt, Makah whalers struck the whale with three harpoons, the third of which was thrown moments after the rifle shot that rendered the whale motionless (Gosho 1999). Whale responses to being struck with a toggle-point harpoon may include increased swimming speed, diving (Øen 1995), thrashing, and ramming boats (Henderson 1984). A harpoon damages only the organ it hits, and its impact is likely too low to damage the central nervous system (Knudsen and Øen 2003); thus, it may not immediately cause the whale's death. Whales may subsequently die, however, due to a harpoon strike (see Angliss and Lodge 2002).

This EIS examines the use of a hand-thrown darting gun as an alternative method of striking and securing whales (Section 3.15.3.5.2, Weapons Associated with the Hunt). The darting gun delivers an explosive grenade, which can contain either black powder or penthrite as the explosive. The grenade has a time-delay fuse and is intended to detonate after penetrating the whale. Detonation of the grenade releases fragments, or shrapnel, causing hemorrhaging and damage to internal organs (O'Hara et al. 1999). The blast from a black powder grenade also emits shock waves that can cause concussion-related injuries to the brain or internal organs (O'Hara et al. 1999). The blast from a penthrite grenade emits a much higher energy shock wave, which is more likely to cause concussion-related injuries further from the blast site, including injuries to the whale's brain or internal organs. These injuries may cause insensibility or immediate death (Øen 1995; O'Hara et al. 1999). The blast injury from either type of grenade works independent of hemorrhage to induce insensibility and/or lethal injuries.

A grenade delivered by a hand-thrown darting gun may kill the whale, but a secondary method of killing is required more often (Øen 1995; O'Hara et al. 1999). Hand-thrown darting guns are aimed at the cervical (neck) and thoracic (chest) region, rather than the head, as the skull is not easily penetrated by the grenade (Butterworth and Brakes 2006; IWC 2007a). Whale responses to being struck with a grenade from a hand-thrown darting gun include death, insensibility, and stunning (Knudsen and Øen 2003), as well as diving (Øen 1995), thrashing, and ramming boats (Bockstoce 1986).

Little data are available for the proportion of whales killed by the first strike from a darting gun. Data regarding the number of bullets or harpoons used to kill whales do not necessarily indicate the proportion of whales killed by the first strike as hunters are encouraged to re-shoot whales if there is any doubt the whale is still alive (Knudsen 2005; IWC 2007a). In the Alaska Eskimo bowhead whale hunt, Øen (1995) reported that the shoulder gun is used almost routinely after the darting gun has been fired. The Alaska data reported to the IWC do not include the number of whales killed by the first strike, possibly because of this routine firing of additional grenades and because of the difficulty in determining whether a struck whale is dead (IWC 2004c). Øen (1995) conducted field studies with penthrite grenades in the Alaska bowhead hunt in 1988 and reported that seven of the eight whales struck with penthrite grenades died from the first grenade thrown; the eighth whale required three grenades. The Russian data reported to the IWC also do not include the proportion of whales killed by the first strike from a darting gun. The data from the Greenland and Norwegian hunts, which use large vessels and deck-mounted harpoon guns and cannons, cannot be readily compared to the Makah (or Alaska Eskimo) hunts, which use small vessels and light weapons.

3.4.3.5.4 Method of Killing and Time to Death

Rifle as the Killing Weapon

Hunters killing a whale with a rifle aim for the whale's central nervous system (especially the brain), with the intent of causing immediate death or unconsciousness (Knudsen and Øen 2003). The accuracy of the first shot is important for the following reason:

> [H]unting with rifle or shotguns involves an inevitable risk of only wounding the animal, as the projectiles are fired from a distance and the animals often present a moving target. The area of impact of the first round will always be decisive with regard to how quickly the animal collapses and dies (Knudsen 2005).

The Makah propose to use a .50 caliber rifle to kill any whale struck and secured with the toggle-point harpoon. In 1999, two shots from the .577 caliber rifle used by the Tribe produced a time to death of eight minutes from the time the harpoon struck the whale until the second rifle shot rendered the whale motionless (Gosho 1999). During the unauthorized hunt in 2007, at least 16 shots struck the whale, but it is unknown what caliber rifle was used. Three separate reports (Ingling 1999; Beattie 2001; Graves et al. 2004) examined past Makah proposals and concluded that a .50 caliber rifle (or greater) is the appropriate caliber of rifle to use, after testing it alongside smaller caliber weapons. Ingling (1999) concluded that for large game, larger bullets are more effective in producing penetration deep enough to reach a vital organ or disabling site in the animal and, thus, require more power (i.e., heavier guns). In addition, rifles that are at least .50 caliber provide a better margin of error in targeting compared to smaller caliber rifles. Graves et al. (2004) added that "small caliber rifles simply will not do the job" of quickly dispatching whales with large size and thick bones, and he concluded that the .50 caliber weapon was the best choice. Graves et al. (2004) and Graves and Hazelton (2004) rejected the .577 rifle used by the

Makah whalers in the 1999 hunt due to difficulty of obtaining ammunition. The necropsy performed after the hunt indicated that the first shot that entered the whale hit the skull and stunned it, while the second shot that entered the whale penetrated its brain and likely killed it instantly (Gosho 1999; IWC 2004c). This EIS does not examine the use of a different caliber rifle as the killing weapon (Section 2.4.5.2, Kill Whales with Smaller Caliber Rifles, explains why this alternative was considered but eliminated from detailed study).

Chukotka Natives use smaller caliber rifles, as well as hand-thrown darting guns, to kill whales. Russia reported that during the 2002 harvest, approximately 28 percent of whales struck were killed with rifles. Hunters used from 3 to 100 bullets per whale and an average of 54 bullets per whale killed (IWC 2004c). Mean time to death for both the rifle and darting gun was 32 minutes for gray whales, with a maximum time to death of 56 minutes (IWC 2004c).

In the Greenland subsistence hunt using deck mounted cannons with a rifle as a back-up killing method, time to death using a rifle is not reported separately. In the Greenland collective minke whale hunt where whales are struck with hand-thrown harpoons and killed with rifles, the number of bullets used is not reported. The average time to death reported for 44 whales killed in the 2005 hunt was 21 minutes, with a maximum time to death of 90 minutes (Greenland Home Rule Government and Greenland Hunter's Organization 2006).

In the Norwegian commercial hunt, Knudsen and Øen (2003) concluded that the .357 and .458 caliber rifles and ammunition used to kill minke whales "are highly capable of causing permanent brain damage of sufficient severity to account for an instantaneous or rapid loss of consciousness." According to Knudsen (2005), "[a] whale that is shot in or near the brain with the rifle will also normally turn over immediately and the flippers and jaw will relax." In the Norwegian hunt almost all whales (95.5 percent) are killed with the first strike by a penthrite grenade (Øen 2006), and the time to death is not separately reported for whales killed with bullets. For whales killed with a rifle after the grenade failed to kill the whale, the mean number of bullets used was 2.6 (in the 1998/99 season), 2.2 (in the 2000/2001 season), and 2.2 (in the 2001/2002 season) (Knudsen 2005).

Explosive Grenade as the Killing Weapon

In addition to the Makah Tribe's proposal to kill whales using a .50 caliber rifle, this EIS examines use of an explosive projectile to kill the whale, delivered by either a hand-thrown darting gun or a shoulder gun (Section 2.3.3.2.5, Overview of Proposed Hunting Method). The cervical and cranial thoracic regions of a whale are the critical target areas for explosive projectiles. Penetration into these regions results in detonation next to the skull and vertebrae, or within the thoracic cavity (O'Hara et al. 1999). How effective the grenade is in killing the whale quickly will depend on where the whale is hit and whether the projectile penetrates to a suitable depth (O'Hara et al. 1999).

Black powder projectiles burn slowly, and they kill whales mostly via secondary blast injuries. Fragments of shrapnel cause tearing of tissues and hemorrhage that can result in the animal's death (O'Hara et al. 1999). Blast trauma to the brain or central nervous system can also cause insensibility or death (O'Hara et al. 1999). Penthrite projectiles burn quickly; they kill whales mostly via primary blast waves, but they also cause extensive local tissue damage that can result in significant hemorrhage. These blast waves cause rapid expansion of gases, which propagates pulsating shock and pressure waves, resulting in concussion-induced brain injury and/or air emboli that travel from gas-containing organs to block blood vessels in the heart and brain, leading to rapid death (O'Hara et al. 1999; Øen 2000). If the grenade does not hit a target area, it has a higher probability of killing the whale than a black powder grenade because it can cause damage farther from the point of detonation (O'Hara et al. 1999; Smith 2007).

In 1988 through 1992, Øen (1995) conducted field trials using penthrite projectiles in the Alaska Eskimo bowhead hunts, comparing them to black powder projectiles used from 1984 to 1986. Data for black powder grenades were the most reliable for 1988 because the information was systematically collected. Results showed reduced time to death for penthrite as compared to black powder (Øen 1995). In 1988, five of the eight bowhead whales (63 percent) died in less than 5 minutes (Øen 1995). The grenades were modified subsequent to the initial penthrite field trials, and data in 1997 and 1998 indicated that time to death was 50 percent of the time to death for black powder grenades (O'Hara et al. 1999). At the 2006 Whale Killing Method Workshop, the Alaska Eskimo Whaling Commission reported that, when placed near the blow hole or within the thorax, the penthrite projectiles appear to give a more rapid time to death than traditional black powder (Alaska Eskimo Whaling Commission 2006; IWC 2007a). The chairperson of the Alaska Eskimo Whaling Commission weapons improvement program has also reported a general preference among Alaska Natives for penthrite, rather than black powder grenades, because "with black powder, the meat has a gas taste" (Associated Press 2005).

The Chukotka Natives use both rifles and darting guns to kill whales. They have used penthrite grenades, but they primarily use black powder grenades. At the IWC Annual Meeting in 2003, the Russian Federation reported that approximately 72 percent of whales killed were killed using the darting gun. Mean time to death for gray whales using both methods was 43 minutes, with a maximum of 220 minutes. In the 2002 season, hunters used an average of 2.7 darting gun projectiles per whale killed (IWC 2004c).

3.4.3.5.5 Proportion of Whales Struck and Lost

During the Makah Tribe's 1999 and 2000 hunts, there were no whales struck and lost; the only whale struck was landed (Gosho 1999; Gearin and Gosho 2000). The Alaska Eskimo Whaling Commission reported to the 2006 Workshop on Whale Killing Methods that from 1996 through 2005 the average proportion of bowhead whales struck and landed in the Alaska Eskimo hunt was 80 percent (Alaska Eskimo Whaling Commission 2006; IWC 2007a). Most of the whales were hunted using hand-thrown darting guns and shoulder guns with black powder grenades. During a field trial of penthrite grenades in 1988, Øen (1995) reported that seven of the eight bowhead whales (88 percent) struck with the penthrite projectile were landed. For the 2003/2004 hunting season, Russia reported that the Chukotka Natives harvested 111 gray whales, including one struck and lost during towing (IWC 2005c). In 2005, the Chukotka Natives harvested 115 gray whales with 9 struck and lost (IWC 2005b). Also in 2005, no struck and lost whales were reported for the Greenland minke whale hunt using a harpoon, but 3 out of 48 minke whales were struck and lost during the Greenland collective hunt, and 2 of the 3 were lost due to adverse weather conditions (Greenland Home Rule Government and Greenland Hunter's Organization 2006).

3.4.3.5.6 Training and Weapons Improvement

The Makah's proposed action includes a training and certification program. It also proposes that the Tribe conduct research and development to refine hunting methods further and revise tribal regulations periodically to improve the safety, effectiveness, and humaneness of the gray whale hunt. This provision is similar to the Alaska Eskimo Whaling Commission's Weapons Improvement Program, which has worked since the late 1980s to develop newer technologies (including use of the penthrite grenade) to increase hunting safety and efficiency. Hunter training would likely reduce time to death and decrease the proportion of struck and lost whales (Alaska Eskimo Whaling Commission 2006; Greenland Home Rule Government and Greenland Hunter's Organization 2006).

3.4.3.5.7 Weather and Sea Conditions

Weather and sea conditions in the project area as they relate to safety are discussed in detail in Public Safety, Section 3.15.3.2, Weather and Sea Conditions. Weather and sea conditions, including motion of the vessel, also may have implications for harpooner or rifleman accuracy, which could affect a whale's time to death and the proportion of whales struck and lost. The efficiency of the hunt could also be affected by these conditions if they improve the ability of the Tribe to successfully tow and land a killed whale. The Makah proposal includes the use of a motor-powered vessel to position the rifleman and to tow a killed whale to shore, and it includes maintaining a 30-foot maximum distance from the rifleman to the whale with minimum visibility of 500 yards.

3.4.3.5.8 Behavior of People Associated with the Hunt

The behavior of people associated with the Makah hunt, including protesters, is also discussed in detail in Public Safety, Section 3.15.3.4, Behavior of People Associated with the Hunt. Based on the 1999 and 2000 protester interventions on the water, and the continuing degree of public and media interest in this issue, vessels and people may interfere with whaling activities, increase the time to death, and increase the potential for not successfully landing a whale struck by Makah hunters.

3.4.3.6 Known and Potential Anthropogenic Impacts

Particularly along the coast of North America, gray whales are exposed to intense human activity. Moor and Clarke (2002) concluded that "[t]he recovery of the gray whale population in the face of long-term exposure to human activities along the North American coast suggests a strong degree of tolerance to such activities." The recovery of the ENP gray whale stock in the face of aboriginal subsistence hunting by Chukotka Natives similarly suggests a tolerance to such activity. The following discussion examines some of the more prominent activities affecting gray whales.

3.4.3.6.1 Aboriginal Subsistence Whaling

ENP gray whales have been hunted by various aboriginal groups for hundreds to thousands of years. In the whales' northern feeding areas, five groups of aborigines hunted along the Chukotkan Peninsula of northeastern Asia in the western Bering, northeastern Okhotsk, and western Chukchi Seas, including the Asiatic (Siberian) Eskimos, Chukchi, Koryaks, Kereks, and Itle'mens (Kamchadals) (Krupnik 1984). The (Alaska) Eskimos also hunted gray whales along the northwestern shores of North America in the eastern Bering and Chukchi Seas for thousands of years (O'Leary 1984). Along the whales' migratory corridors and in the more southern feeding areas south of the Alaskan Peninsula, several Indian tribes between the Aleutian Islands and California hunted gray whales and/or used drift whales for subsistence as a part of their cultural and religious traditions, including the Aleuts, Koniag, Chugash, Tlingit, Haida, Tsimshian, Nootka, Makah (including Ozette), Quileute, Klallam, and Chumash (O'Leary 1984). Some of these tribes hunted during the American and industrial commercial whaling eras. The last Makah hunts in this timeframe were recorded in the 1920s.

Between 1948 and 1955, subsistence hunters in the Chukotkan Region took 241 total gray whales, averaging 30 whales annually (Zimushko and Ivanshin 1980). From 1956 to 1968, the catches in that region increased to an average 158 animals annually (Zimushko and Ivanshin 1980). From 1968 to 1977, the Soviet Ministry of Fisheries imposed catch limits: 140 to 150 whales from 1968 to 1972 and 200 whales annually from 1972 to 1977 (Zimushko and Ivanshin 1980). The IWC established aboriginal subsistence whaling catch limits for the ENP gray whale stock starting in 1978 (Table 3-9).

Gray whale catches the United States reported to the IWC from 1985 to 2005 included the one whale harvested by the Makah Tribe in 1999[8]. Although Alaska natives hunted whales prior to 1989, the United States had not presented a proposal to the IWC for this hunt, nor had NMFS published a quota under the WCA.

[8] The one whale illegally hunted by tribal members in 2007 will be reported to the IWC in 2008.

TABLE 3-9. ABORIGINAL SUBSISTENCE WHALING CATCH DATA FOR ENP GRAY WHALES REPORTED TO THE IWC

YEAR	TOTAL FIVE-YEAR ALLOCATION BY IWC	TOTAL ANNUAL ALLOCATION BY IWC	TOTAL TAKES	RUSSIAN FEDERATION (CHUKOTKANS)	UNITED STATES (ALASKA ESKIMOS)	UNITED STATES (MAKAH)
1978	Get	179	184	182	2	0
1979		179	182	178	4	0
1980		179	181	178	2	0
1981		179	135	135	0	0
1982		179	169	165	4	0
1983	Get	get	171	169	2	0
1984			168	168	0	0
1985			170	169	1	0
1986			171	169	2	0
1987			158	158	0	0
1988	Get	get	151	150	1	0
1989			180	179	1	0
1990			162	162	0	0
1991			169	169	0	0
1992			0	0	0	0
1993	Get	get	0	0	0	0
1994			44	44	0	0
1995			92	90	2	0
1996			43	43	0	0
1997			79	79	0	0
1998	Get	get	125	125	0	0
1999			124	123	0	1
2000			115	115	0	0
2001			112	112	0	0
2002			131	131	0	0
2003	620 (to Russian Federation and United States)	140	128	128	0	0
2004		140	111	111	0	0
2005		140	124	124	0	0
2006		140	NA	NA	0	0

Source: IWC 1980 for catch data from 1978, IWC 1987 for catch data from 1984

3.4.3.6.2 Environmental Contaminants

Environmental contaminants that enter the marine environment through atmospheric, ocean current, and terrestrial transport originate from a variety of urban and rural anthropogenic sources, including agricultural use of pesticides, industrial disposal of manufacturing or pharmaceutical by-products, industrial processing or burning of fossil fuels, and municipal discharge or runoff associated with landfills, wastewater treatment plants, and miles of streets and roads. Marine ecosystems in the northeastern Pacific receive pollutants from a variety of local, regional, and international sources (Grant and Ross 2002; EVS Environmental Consultants 2003; Garrett 2004).

These chemicals and compounds include organochlorines (e.g., DDT, PCB, dioxins, and furans), heavy metals (e.g., copper, mercury, and lead), and newly emerging chemicals (i.e., those recently discovered, such as flame retardants), that may have direct lethal effects on individual animals or insidious effects on animal populations through impaired reproductive, metabolic, and immune functions (O'Hara and O'Shea 2005). Bioaccumulation through trophic transfer in the marine food chain allows relatively high concentrations of these compounds to build up in top-level marine predators, such as marine mammals (O'Shea 1999). Gray whales, in particular, may ingest these environmental contaminants when they bottom-feed in areas where the sediment and benthic prey are contaminated.

See Section 3.16.3.2, Environmental Contaminants in Gray Whales, for descriptions of concentrations of organochlorines in gray whale tissues; the descriptions are synthesized from various studies. Many organochlorines are highly fat-soluble and have poor water solubility, which allows them to accumulate in the fatty tissues of animals, where most storage occurs (O'Shea 1999; Reijnders and Aguilar 2002). Some are highly persistent in the environment and resistant to metabolic degradation. Pinnipeds and porpoises carry far greater amounts of PCBs and DDTs than baleen whales and fish, however, because of their higher positions in food chains (O'Shea and Aguilar 2001; Reijnders and Aguilar 2002).

Section 3.16.3.2 also addresses concentrations of heavy metals (including mercury, lead, and copper, among others) in gray whale tissues, synthesized from various studies. The three elements usually considered of greatest concern to cetaceans are mercury, cadmium, and lead (O'Shea 1999). Mercury, cadmium, and other metals accumulate primarily in the liver and kidneys, whereas lead concentrates mostly in bones (Reijnders and Aguilar 2002). Concentrations of most metals tend to increase throughout an animal's life. Most metals are stored in fatty tissues. There are, however, organic forms of metals, such as methylmercury, that accumulate in the lipids of prey species. Many marine mammal species can tolerate high amounts of metals or detoxify them (Reijnders and Aguilar 2002). Published accounts of metal-caused pathology are scarce (O'Shea 1999).

In the 1999 and 2000 mass stranding events, chemical contaminants were a possible factor contributing to the increased mortality (Gulland et al. 2005). Overall, however, no contaminant found would be the proximate cause for acute mortality of the observed magnitude

(Gulland et al. 2005). The mean concentrations of organochlorines in the blubber of gray whales stranded in 1999 were well below levels observed in apparently healthy gray whales harvested in Russia (Tilbury et al. 2002). Also, lower levels of total mercury and methylmercury were reported in the muscle, kidney, and liver tissues of four gray whales that stranded in the Gulf of California in 1999 than were reported for other marine mammals, though sampling differences and the effect of decomposition on blubber lipids may alter the results of chemical analysis (Gulland et al. 2005).

3.4.3.6.3 Harmful Algal Blooms

Single-celled algae are the base of the food chain in the marine environment, and they proliferate or aggregate to form dense concentrations of cells called blooms when certain environmental conditions prevail. Algal blooms can produce marine biotoxins, which can accumulate in fish, seabirds, and other marine biota. Harmful algal blooms occur in coastal marine environments throughout the United States, including waters of Puget Sound and off the coasts of Washington, Oregon, and California. There is evidence that harmful algal blooms have increased in frequency, magnitude, and seasonal duration over the past 10 years, possibly due to global climate change, toxic algal species extending to new areas, and human-related eutrophication of the coastal environment (Trainer 2001). Though less than 5 percent of the known dinoflagellate species and fewer than 25 species in one genus of diatoms produce compounds that are known to be toxic to marine mammals (Van Dolah 2005), some marine mammal morbidity and mortality, including mass strandings, have been associated with marine biotoxin exposure and harmful algal blooms. Along the west coast of the United States, some of the most deleterious biotoxins produced by harmful algal blooms include saxitoxin (the toxin that causes paralytic shellfish poisoning in humans), domoic acid, and *Heterosigma akashiwo* (Horner et al. 1997). Gray whales have thus far, been shown to be affected by saxitoxin or domoic acid, as explained below.

Saxitoxin

In 1987, acute levels of saxitoxin, produced by a dinoflagellate bloom, were associated with the death of 14 humpback whales off the coast of Cape Cod, Massachusetts (Geraci 1989; Van Dolah 2005). Saxitoxin was also a contributing factor in the mortality of bottlenose dolphins in a Florida lagoon in 2001 and 2002 (Van Dolah 2005). Scientists have also postulated that chronic, sublethal exposure to saxitoxin through ingestion of copepods may affect right whale reproductive rates by lowering diving rates and feeding time, decreasing overall fitness (Van Dolah 2005). Researchers have demonstrated that saxitoxin has a high affinity and specific binding to the nerve preparations of the brains of gray whales, humpback whales, California sea lions, and manatees (Trainer and Baden 1999).

Domoic Acid

In 1991, the first evidence of domoic acid on the west coast of North America was a mass mortality of pelicans and cormorants in Monterey Bay, California (Van Dolah 2005). The first confirmed domoic acid poisoning of marine mammals occurred in 1998 in the same area, when more than 70 California sea lions stranded from San Luis Obispo to Santa Cruz (Scholin et al. 2000). Of the 70 sea lions that stranded, 57 sea lions died due to acute toxicity from eating anchovies (Van Dolah 2005). A similar event occurred in 2000 in the same region, when the stranding of 187 sea lions was associated with domoic acid (Gulland et al. 2002; Van Dolah 2005). Concurrent with the 2000 sea lion mortality event, abnormally high numbers of gray whale strandings occurred (Van Dolah 2005). One of the three gray whales whose cause of death was determined in the 1999 and 2000 unusual mortality event was likely intoxicated with domoic acid (Gulland et al. 2005). The levels of domoic acid in the necropsied whale would indicate acute toxicosis in a laboratory primate, but toxic doses for cetacea are undetermined (Truelove and Iverson 1994). Biotoxins thus were one of the factors listed as potentially contributing to the increased number of gray whale mortalities observed in 1999 and 2000, though too few carcasses were adequately sampled to assess their importance in the mortality event (Gulland et al. 2005). In February 2002, researchers documented a domoic acid event on the California coast; it involved nine marine mammal species and the deaths of thousands of sea lions; none of the reported strandings or deaths was a gray whale (Van Dolah 2005).

3.4.3.6.4 Oil Spills and Discharges

Exposure to petroleum hydrocarbons released into the marine environment through oil spills and other discharge sources represents another potential anthropogenic impact on gray whales in the project area. Inhalation of vapors at the water's surface and ingestion of hydrocarbons during feeding are the most likely pathways of exposure. Acute exposure to petroleum products can cause changes in behavior and reduced activity, inflammation of the mucous membranes, lung congestion, pneumonia, liver disorders, and neurological damage (Geraci and St. Aubin 1990). Marine mammals can generally metabolize and excrete limited amounts of hydrocarbons, but acute or chronic exposure poses greater toxicological risks (Grant and Ross 2002).

At the water's surface, gray whales have been observed lying in or swimming through oil from the *Exxon Valdez* oil spill along the Alaska coast (Moore and Clarke 2002), and they have been observed migrating through natural seeps near Santa Barbara, California (Kent et al. 1983). Kent et al. (1983) observed that gray whales generally swam faster, stayed submerged longer, and took fewer breaths than whales that did not pass through oil; they also sometimes changed direction to swim around the surface oil, though it was not clear that the change in direction was in response to the oil. Some scientists have concluded that cetaceans have a thickened epidermis that greatly reduces the likelihood of petroleum toxicity from skin contact with oiled waters (Geraci 1990; O'Shea and Aguilar 2001). Geraci (1990) proposed that gray whales probably experience eyes and tactile hair follicle irritation upon contact with oil, but that long-lasting effects to skin tissue were less likely. This observation was based on laboratory tests on bottlenose dolphins; because the dolphins did not exhibit a vascular reaction to contact with petroleum products (Geraci 1990). Other scientists have proposed that cetaceans with rough or damaged skin, such as the barnacle-covered skin of a gray whale, may be more susceptible to oil contamination and subsequent bacterial infection than smoother-skinned cetaceans (Albert 1981). Moore and Clarke (2002) reported that it is unclear whether gray whales can detect surface oil.

Gray whales could consume oil from fouled baleen, by engulfing tar balls, or by bottom feeding on contaminated sediments (Geraci 1990; Moore and Clarke 2002), though there are no reported cases of ingestion. Twenty-five whales stranded were after the Exxon Valdez spill; the whales had oil on their baleen, but not in their digestive tracts, suggesting that the baleen was fouled after death (Moore and Clarke 2002). Geraci and St. Aubin (1985) concluded that oil impact on baleen was slight and short term, based on laboratory tests where 70 percent of oil was flushed from baleen in 30 minutes, but Geraci (1990) proposed that baleen fibers could remain oiled if a whale was feeding in a highly oiled area where fouling outpaced the flushing rate. Moore and Clarke (2002) noted that oil and chemical dispersants, used to break up surface oil and cause it to sink, could contaminate benthic sediments. They proposed that any large-scale contamination of a primary feeding area could negatively affect the population.

Due to its proximity to Alaska's crude oil supply, Puget Sound is one of the leading petroleum refining centers in the United States, with about 15 billion gallons of crude oil and refined petroleum products transported through it annually (Puget Sound Action Team 2005). Inbound oil tankers carry crude oil to four major refineries in the sound, while outbound tankers move refined oil products to destinations along the United States west coast (Neel et al. 1997). In 2003, 746 oil tankers passed through Washington's waters bound for ports in Puget Sound, Canada, and along the Columbia River (Ecology 2004). This volume of shipping traffic puts the region at risk of having a catastrophic oil spill. The proposed removal of the current moratorium on oil and gas exploration and development off the British Columbia coast may increase the danger of a major accident in the region. The possibility of a large spill is one of the most important short-term threats to coastal organisms in the northeastern Pacific (Krahn et al. 2002).

Neel et al. (1997) reported that shipping accidents were responsible for the largest volume (59 percent; 3.4 million gallons [12.9 million liters]) of oil discharged during major spills in Washington from 1970 to 1996. Other sources were refineries and associated production facilities (27 percent; 1.5 million gallons [5.7 million liters]) and pipelines (14 percent; 800,000 gallons [3.0 million liters]). Eight major oil tanker spills exceeding 100,000 gallons (378,500 liters) have occurred in the state's coastal waters and on the Columbia River since the 1960s, with the largest estimated at 2.3 million gallons (8.7 million liters). Grant and Ross (2002) did not report any major vessel spills from British Columbia during this same period, but at least one spill of 100,000 gallons (379,000 liters) is known to have occurred in Canadian waters at the mouth of the Strait of Juan de Fuca in 1991 (Neel et al. 1997). In addition to these incidents, numerous near accidents have resulted from vessel groundings, collisions, power loss, or poor vessel condition (Neel et al. 1997).

Puget Sound's four oil refineries are located on the coast at Anacortes (Shell Oil and Texaco), Ferndale (Mobil Oil), and Tacoma (United States Oil). Four major spills have occurred at two of these facilities, with each causing some discharge of petroleum into marine waters (NMFS 2005b). Pipelines connecting to refineries and oil terminals at ports represent another potential source of coastal spills. Pipeline leaks have caused several major spills in western Washington, but only the 1999 Olympic spill resulted in any discharge to marine waters (Neel et al. 1997).

During the late 1980s and early 1990s, Washington significantly upgraded its efforts to prevent oil spills in response to increased spills in the state and the *Exxon Valdez* accident in Alaska. A number of state, provincial, and federal agencies now work to reduce the likelihood of spills, as does the regional Oil Spill Task Force, which formed in 1989. National statutes enacted in the early 1990s, including the United State's Oil Pollution Act in 1990 and the Canada Shipping Act in 1993, have also been beneficial in creating spill prevention and response standards. Since 1999, Washington State has maintained a rescue tugboat at Neah Bay for approximately 225 days per year during the winter months to aid disabled vessels and thereby prevent oil spills. These measures appear to have helped reduce the number and size of spills since 1991, but continued vigilance is needed (Neel et al. 1997). In general, Washington's outer coast, the Strait of Juan de

Fuca, and areas near the state's major refineries are the locations most at risk of major spills (Neel et al. 1997). The area to be avoided was designated in the OCNMS to minimize the risk by routing large vessels away from dangerous and sensitive areas. An analysis by NOAA of the effectiveness of the voluntary area to be avoided restriction shows a decrease in the number of commercial vessels transiting the area following the designation. From July through September 1999, 511 vessels transited the area, down from 643 vessels for the same period in 1995, when the area to be avoided was established.

Chronic small-scale discharges of oil into marine waters from a variety of sources, including tanker ballast waters, ship bilge and fuel oil, and municipal and industrial waste, greatly exceed the volume released by major spills (Clark 1997) and are another potential impact to gray whales. Though chronic oil pollution has been documented in large numbers of seabird deaths (e.g., Wiese and Robertson 2004), less is known about its impact on gray whales and other marine mammals. The long-term effects of repeated ingestion of sub-lethal quantities of petroleum hydrocarbons on marine mammals are also unknown.

3.4.3.6.5 Offshore Activities and Underwater Noise

Anthropogenic activities in the ocean have increased over the past 50 years, resulting in more underwater noise (Hildebrand 2005). Underwater noise, associated with offshore oil and gas development, commercial fishing and vessel traffic, whale-watching, and scientific research, is often regarded as the primary source of disturbance to gray whales resulting from these activities (Moore and Clarke 2002). Noise specifically related to whale-watching and vessel disturbance is described directly below under the Whale-watching subheading. A broader discussion of noise (including both atmospheric and underwater noise) in the project area, is in Section 3.11, Noise, and its effects on wildlife other than gray whales is in Section 3.5, Other Wildlife Species. Gray whale reactions to offshore activities have been relatively well studied compared to those of other mysticetes (Moore and Clarke 2002). Researchers have noted short-term behavioral responses of gray whales to underwater noise. Malme et al. (1988) concluded there is a 50/50 chance that whales will change course to avoid the continuous broadband noise associated with aircraft, ships, and seismic explorations when sound levels exceed approximately 120 decibals (dB)[2] and to intermittent noise when levels exceed approximately 170dB. Moore and Clarke (2002) noted that, although these values provide some useful baseline information on the levels of industrial noise to which gray whales respond, the distance from the noise source at which these levels occur varies with geographic region and sea condition. In addition to altering swimming course and speed, gray whales exhibited abrupt behavioral changes in response to playback sounds and airgun blasts, including switching from feeding to avoidance, with a resumption of feeding after exposure (Malme et al. 1984); and changing calling rates, call structure, and surface behavior, usually from traveling to milling (Dahlheim 1987).

Malme (1989) prepared a disturbance-ranking scheme for oil and gas noise sources off Alaska. Modeling indicated that gray whales have a high probability of being influenced by noise from oil and gas operations, including large tankers, dredges, and airgun arrays (Malme et al. 1988), but other studies indicated that the noisiest period of offshore oil and gas operations occurs during exploration and site establishment (Richardson et al. 1995). Production activities are generally quieter and require fewer support operations (Moore and Clarke 2002). Specific gray whale reactions to whale-watching include changing course and altering their swimming speed and respiratory patterns when followed by whale-watching boats (Bursk 1989), but Jones and Swartz (1984) documented that gray whales in the San Ignacio Lagoon of Baja California become less likely to flee as the season progresses. Cow-calf pairs of gray whales are considered more sensitive to disturbance by whale-watching vessels than other age or sex classes, for instance (Tilt 1985). Gray whales also preferentially avoid low frequency active transmissions conducted in a landward direction (Tyack and Clark 1998). Reported gray whale reactions to aircraft vary and seem related to ongoing whale behavior and aircraft altitude (Moore and Clarke 2002). Specific gray whale reactions to scientific research (tagging) include fluke-slapping and rapid swimming, but the whales returned to normal behavior shortly after tagging (Harvey and Mate 1984).

3.4.3.6.6 Vessel Interactions

Whale-watching for gray whales is an important recreational industry and activity along the west coast of North America, from the wintering grounds in the lagoons of Baja California to British Columbia, Canada, although most targeted gray whale whale-watching occurs in the winter range, where tourist boats offer trips to see (and sometimes pet) newly born gray whale calves and mothers. In Washington and British Columbia, killer whales easily surpass gray whales as the main target species of the commercial whale-watching industry (Hoyt 2001). The activity of commercial whale-watching vessels and private recreational boats has raised concerns about its effect on gray whales. In response to these concerns, regulations minimize disturbance by vessels in Mexico, the United States, and Canada.

In Mexico, the government has applied whale-watching regulations to commercial operators since 1997. There are currently regulations governing the numbers of boats and methods of approach for four specific whale-watching areas in the lagoons. There are no minimum approach distances, but boats cannot chase whales. The northern two-thirds of San Ignacio lagoon closes to tourism and fishing activities during the breeding and calving season. In the southern third of San Ignacio lagoon (nearest the ocean), whale-watching tourism is closely regulated to allow access to only limited numbers of people (United Nations 1999). In Washington and British Columbia, NMFS and conservation organizations in the United States have teamed up with the Canadian government and conservation organizations to adopt 'Be Whale Wise' guidelines for vessels, kayaks, and other crafts watching whales. The guidelines, among other things, recommend that vessels keep a 100-yard (100-meter) buffer between the vessel and the whale, and recommend a slow approach speed of 7 knots within 400 yards (400 meters) of whales.

Whale-watching along the migration route is not heavily regulated and it has been suggested that this activity, in combination with commercial fishing and vessel operations, may cause gray whales to migrate further offshore (Wolfson 1977). Researchers conducted various studies on the reaction of gray whales to whale-watching vessels in winter on their wintering range and, to some extent, during migration (Urbán-Ramírez et al. 2003). Researchers have paid little attention to the northern portion of the summer range in the Bering Sea and adjacent Arctic Ocean because whale-watching is largely undeveloped in those areas (Richardson et al. 1995). One study reported on the reaction of gray whales feeding off Vancouver Island during summer to whale-watching vessels (Bass 2000). In general, scientists remain cautious about the effects of whale-watching on gray whales (e.g., Gard 1974; Rice 1975; Reeves 1977; Jones et al. 1994), but the response of gray whales to whale-watching vessels appears to be short term and temporary.

In the winter range, vessels in the lagoons can cause short-term escape reactions in gray whales, especially when boats move erratically or quickly (Reeves 1977; Swartz and Cummings 1978; Swartz and Jones 1978; Swartz and Jones 1981). Bursk (1989) reported that gray whales often changed speed and deviated from their course when near whale-watching vessels. Observers noted that gray whales have also displayed evasive behavior termed snorkeling, where whales came to an almost compete halt to breathe in an inconspicuous manner. Mosig (1998) reported an inverse relationship between the average number of whale-watching vessels and the average number of gray whales in Laguna San Ignacio in the winter of 1997, but she could not demonstrate any direct effect of vessels on whales. Jones and Swartz (1984 and 1986) found no evidence that gray whales abandoned the lagoons when whale-watching vessels were present; observers noted that some gray whales were attracted or showed no response to quiet, idling, slow-moving, or anchored vessels, especially late in winter (Norris et al. 1983; Dahlheim et al. 1984; Jones and Swartz 1984; Jones and Swartz 1986; Richardson et al. 1995). During the course of all of these studies, there has been no evidence to demonstrate whale-watching vessels cause any more than a temporary effect on the behavior of gray whales and no apparent effect on the health of the population in the lagoons on the wintering grounds (Gard 1974; Jones et al. 1994).

Along the migration route, including the southern portion of the summer range, whale-watching vessels can also cause short-term reactions in gray whales. Migrating whales disturbed by vessels tended to exhale underwater and surface only long enough to inhale before resubmerging (Hubbs and Hubbs 1967). Observers noted that migrating gray whales also changed course more often with increasing numbers of whale-watching vessels (Bursk 1983; Bursk, in Atkins and Swartz 1988). Heckel et al. (2001) found substantial differences in both speed and direction of the transit of migrating gray whales with and without the presence of whale-watching vessels off Baja California. While these studies show migrating gray whales appear to react to whale-watching vessels, there is no evidence to suggest they have altered location of the migration route, migration timing, or the sequence of migration by sex and age groups. Whale-watching vessels regularly approach gray whales feeding in Clayoquot Sound, on the west coast of Vancouver Island, British Columbia, during summer. Whales responded to the vessels by changing their dive patterns, but the changes appeared to be temporary and not biologically significant (Bass 2000).

Harvey and Mate (1984) observed that gray whales sometimes responded to tagging by fluke slapping and rapid swimming, but usually returned to pre-tagging behavior shortly after the event. The response of gray whales to biopsy darts has not been described, but other mysticetes are observed having brief, sometimes dramatic, changes in behavior (Brown et al. 1991; Weinrich et al. 1991). Although the gray whale population is exposed to whale-watching vessels and other disturbances on the wintering grounds and along much of the migration route, it has demonstrated a tolerance and resiliency to whale-watching and other noisy human activities as reflected by the successful recovery of the population from over-exploitation (Cowles et al. 1981; Moore and Clarke 2002).

3.4.3.6.7 Activities Occurring in the Winter Range

Much of the coastal area surrounding the Baja lagoons and the gray whale wintering range is protected by law and limited access. In 1988, the Mexican government established El Vizcaino Biosphere Reserve, an area totaling 2,546,790 acres and encompassing Ojo de Liebre (Scammon’s Lagoon), Guerreo Negro, and the San Ignacio Bay gray whale sanctuaries. Portions of the reserve, including San Ignacio and the Ojo de Liebre lagoons, were designated as United

Nations Educational, Scientific, and Cultural Organization world heritage sites in 1993 (Urbán-Ramírez et al. 2003). In 2005, the Bay of Loreto National Marine Park, in the northern area of the Sea of Cortez, joined the list. In May 2002, all Mexican territorial seas and the EEZ were declared as a refuge for the protection of large whales. See Urbán-Ramírez et al. (2003) for additional information on formal protection of gray whales in Mexico. Whale-watching is discussed above in further detail, but other activities in the winter range that have been identified as future environmental concerns by ParksWatch of Mexico are discussed below.

Mineral and Salt Mining

Mining for minerals (such as copper, manganese, gypsum, cobalt, silica, and phosphorus) peaked in the last century in places like Santa Rosalia, creating soil erosion, contamination, pollution, and litter in the ocean. Large mining companies have since abandoned these sites, and the town is in economic decline (ParksWatch 2004). The largest salt mine in the world is, however, still operating at Guerrero Negro, where approximately 7 million tons per year is extracted from the ocean through evaporation (ParksWatch 2004). The main threat posed by salt mining is the byproducts created by high salt concentrations (ParksWatch 2004).

In 1995, two large corporations proposed to expand industrial salt extraction by establishing a plant on the shores of San Ignacio Lagoon, Mexico. International and national concern arose as to whether the then-proposed salt plants would divert fresh water from pumping, produce and discharge toxic brine and other water-based pollutants into the lagoon waters, and spur further development, among other issues, potentially having adverse effects on the ecosystem and gray whales (e.g., Sullivan 2006). At the 52nd meeting of the IWC, Urbán-Ramírez (2000) reported the results of a study on the proposed saltworks project. In particular, he evaluated potential impacts on the gray whales that use this wintering area for breeding, calving, and calf rearing. According to his study results, the salt facility in San Ignacio would not harm gray whales. Nonetheless, on March 2, 2000, the government of Mexico cancelled the saltworks project. Conservation agreements negotiated between the Laguna San Ignacio Conservation Alliance and communal landowners have since placed 120,000 acres of land around the lagoon in a private land trust, and more agreements are anticipated (Sullivan 2006). Thus, while the local people fish and provide ecotourism and whale-watching, it is reasonable to assume that the area will remain a sanctuary for wintering gray whales (Sullivan 2006).

Shore-Based Commercial Development in Bahia Magdalena

The growth of gray whale tourism in the North Zone of Bahía Magdalena has led to a proposed Japanese-owned and financed tourist resort development at Bahía Magdalena (Dedina and Young 1995). Although NMFS identified this activity as a potential threat to the whales and their habitat in its 1999 gray whales status review (e.g., water quality degradation, increase in whale-watching tourism, etc.), there are currently no plans to proceed with this development (Rugh et al. 1999). Since 1999, the Mexican government (Fonatur, the national fund for the promotion of tourism) has planned to improve and promote the growth of various marinas around the Baja Peninsula, improve associated airports and airstrips, and pave a highway across the peninsula to improve yachting access and tourism. To date, the project has yet to be analyzed or implemented.

3.4.3.6.8 Ship Strikes

The nearshore migration route used by gray whales makes ship strikes a potential source of injury and mortality (Laist et al. 2001). Anecdotal data and strandings recorded by the Marine Mammal Stranding Network provide helpful, but incomplete, data on the occurrence, frequency, and significance of vessel-related whale deaths and injuries (Laist et al. 2001). From 1975 to 1980, there were reports of 12 collisions and 6 confirmed deaths of gray whales off the coast of southern California, and 7 of 489 gray whales stranded between Mexico and Alaska from 1975 to 1989 had apparent propeller injuries (Laist et al. 2001). Ferrero et al. (2000) reported five gray whale mortalities off California from ship strikes from 1993 to 1995, and one ship strike mortality occurred off Alaska in 1997. Between 1999 and 2003, the California marine mammal stranding network reported four serious injuries or mortalities of gray whales caused by ship strikes, one each in 1999, 2000, 2001, and 2003 (Angliss and Outlaw 2005). Based on the photo-id catalog maintained for gray whales in the winter range, Urbán-Ramírez et al. (2003) reported that an estimated 2 percent (then about 1,600) of the whales had injuries (scars) from impact with a large keel or propeller. Additional mortality from ship strikes probably goes unreported because the carcasses sink at sea (i.e., the whales do not strand), the beached carcasses do not show obvious signs of ship strikes, or the whales may not die when hit (Urbán-Ramírez et al. 2003). It is impossible to quantify the actual mortality of gray whales from this source, and an annual mortality rate of one or two gray whales per year from ship strikes represents a minimum estimate. Laist et al. (2001) suggests that most lethal or severe injuries are caused by large ships 80 meters (263 feet) or longer and by ships traveling 14 knots or faster.

3.4.3.6.9 Incidental Catch in Commercial Fisheries

The following information comes from NMFS' 2008 Stock Assessment Report (Angliss and Outlaw 2008). NMFS recognizes 22 commercial fisheries in Alaska that use trawl, longline, or pot gear and could have incidental serious injuries or mortalities of gray whales. No observed serious injuries or mortalities have occurred in any of those fisheries. NMFS observers monitored the Makah tribal set gillnet fishery from 1990 to 1998 and in 2000, reporting one gray whale taken in 1990 and one in 1995. One gray whale was entangled in a set gillnet during this fishery; it was released alive in 1996. NMFS observers also monitored the California/Oregon thresher shark/swordfish drift gillnet fishery from 1993 to 2003 and reported one mortality in 1998 and one in 1999. No serious injuries or mortalities have been reported in that fishery since 1999. The mean annual mortality rate from these monitored fisheries was 1.2 (the coefficient of variation is 0.85) gray whales per year. Additional information on gray whale mortalities from fisheries interactions comes from logbooks and stranding data. Angliss and Outlaw (2008) reported annual fishery mortality data from fisher logbooks (rounded up to one whale) and from stranding reports (rounded up to seven whales). Taken into account with the monitored fisheries, they estimated a total minimum annual mortality rate in commercial fisheries of approximately seven whales. Although there may be other unreported mortalities in commercial fisheries, Angliss and Outlaw (2005) concluded that fishery mortalities can be considered insignificant. Gray whales also migrate through Canada's exclusive economic zone and are subject to fisheries interactions there as well. Baird et al. (2002) estimated the annual mortality in Canadian fisheries to be around two whales.

3.4.3.6.10 Marine Energy Projects

Although not yet analyzed, approved, or implemented by the Federal Energy Regulatory Commission and various energy companies, 10 marine energy projects currently are proposed in Washington State. In its August 2006 report to the Washington Fish and Wildlife Commission, the WDFW stated that applications for licensing submitted to the Federal Energy Regulatory Commission cover the following project locations:

- San Juan Channel 116 turbines (60-foot rotors)
- Guemes Channel 166 turbines (30-foot rotors)
- Admiralty Inlet (1,010 turbines)
- Agate Pass 130 turbines (9-foot rotors)
- Speiden Channel (168 turbines)
- Rich Passage 62 turbines (30-foot rotors)

- Tacoma Narrows 60 turbines (60-foot rotors)
- Four to 20 turbines (30 to 60-foot rotors) (Snohomish County PUD) Deception Pass
- One hundred to 300 turbines (Washington Tidal Energy)
- Columbia River 50 to 150 turbines (25 to 50-foot rotors)

Generally, the concept for most of these proposed projects is to take wind turbines and place them under water to use the energy from tidal currents to generate electricity (WDFW 2006b). The actual impacts of these types of projects are unknown because very few exist in the world, but WDFW (2006b) has identified preliminary potential impacts to birds, fish, and marine mammals. They include, but are not limited to, direct mortality or injury from turbine blade strikes, interference with migratory patterns, measures to protect equipment from marine growth, direct habitat loss from equipment and infrastructure placement, impacts on currents, changes in water surface elevations, effects on commercial and recreational fishing areas and equipment, changes in sediment transport, and other issues not yet identified. The WDFW will design studies to assess effects on fish, birds, marine mammals, and their habitats (WDFW 2006b).

In December of 2007, the Federal Energy Regulatory Commission issued a license for a pilot wave energy project in Makah Bay, located in the Makah U&A, within the gray whale's migratory corridor (other applications are also proposed for siting in areas that some gray whales could potentially travel). Under the license, Finavera Renewables Ocean Energy Ltd., will place four buoys about 3.7 miles from shore in approximately 150 feet of water. Each buoy will be tethered by cables to four surface floats (approximately 4 feet in diameter) and each float will be connected by a cable to a subsurface anchor buoy just above the seafloor. All cables in the anchoring system will be under tension. A transmission cable will connect the buoys to a transmission station on land. This cable will lie along the ocean floor until it reaches a depth that is 10 to 30 feet below mean lower low tide, at which point it will be underground until it reaches the station. At this time the applicant has no definitive plans for future expansion of the project (AquaEnergy 2006). Finavera and FERC examined the environmental effects of the project and concluded there would be only minor or localized risks to gray whales. Impacts of the project to other resources are examined in Section 5.0, Cumulative Effects.

3.5 Other Wildlife Species

3.5.1 Introduction

Various marine mammals and birds inhabit the project area, with the highest use during late spring through early fall and the lowest use during winter (NOAA 1993). Twenty-nine species of marine mammals and 109 species of marine birds have been recorded in the project area (NOAA 1993). Of these species, eight mammal and four bird species are listed under ESA as threatened or endangered. Four federally listed reptiles (leatherback sea turtles, green sea turtles, loggerhead sea turtles, and olive ridley sea turtles) also could occur in the area. Species occurring in the project area and listed as threatened or endangered by Washington State, but not under the federal ESA, include one marine mammal (sea otter).

3.5.2 Regulatory Overview

Various federal, state, and local regulations address the protection of threatened, endangered, and sensitive wildlife in the project area. Table 3-10 provides regulations for wildlife. In most cases, city and county regulations reflect WDFW recommendations. For a detailed description of NMFS' management of marine mammals (including, but not limited to, gray whales), see Section 3.4.2.1, Marine Mammal Protection Act Management.

With regard to disturbance of marine wildlife, MMPA prohibits (with some exceptions) the harassment of marine mammals in United States waters. The 1994 amendments to the MMPA defined harassment (Level B) as any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. Loud, continued noises could be considered harassment to wildlife, particularly to marine mammals that use sound to communicate.

To protect nesting seabirds and marine mammals from noise and physical disturbance from low-flying aircraft, OCNMS prohibits flying motorized aircraft less than 2,000 feet over certain areas of the Sanctuary. These restrictions are described in greater detail in Section 3.1.1.1.2, Designation (of the OCNMS) and Regulatory Overview. Although codified as federal law, National Marine Sanctuary overflight regulations are not recognized by the Federal Aviation Administration. The Sanctuary, however, has made increasing voluntary compliance with this regulation a major priority (Galasso 2005). Notably, data collected by University of Washington researchers studying marine birds at Tatoosh Island were used to conduct an enforcement action against a helicopter pilot and contracting passenger (Parrish et al. 2005).

TABLE 3-10. FEDERAL, STATE, AND LOCAL REGULATIONS FOR PROTECTED WILDLIFE

REGULATION	OVERSEEING AGENCY	WILDLIFE SPECIES AND HABITATS ADDRESSED
Federal		
Marine Mammal Protection Act (MMPA)	NMFS and FWS	All marine mammal species.
Whaling Convention Act (WCA)	NMFS	All large cetacean species subject to aboriginal subsistence whaling.
Endangered Species Act (ESA)	FWS and NMFS	All federally listed threatened and endangered species and critical habitats. Federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.
Migratory Bird Treaty Act and Executive Order 13186	FWS	Most migratory birds. The act provides that it is unlawful to pursue, hunt, take, capture, or kill these birds.
Bald Eagle Protection Act and Eagle Protection Act	FWS	Bald eagle (and golden eagle). The act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions.
Olympic Coast National Marine Sanctuary regulations, 15 CFR Part 922, Subpart O	NOAA National Ocean Science, National Marine Sanctuary Program	Sea turtles, seabirds, and their habitats. The regulations prohibit take of these wildlife, except as authorized by ESA, MMPA, Migratory Bird Treaty Act, or pursuant to any relevant Indian treaty, provided that the treaty is exercised in accordance with ESA, MMPA, and Migratory Bird Treaty Act, to the extent that they apply. These regulations prohibit flying motorized aircraft at less than 2,000 feet elevation both above the sanctuary and within 1 nautical mile of the Flattery Rocks National Wildlife Refuge or within 1 nautical mile seaward from the coastal boundary of the sanctuary, with limited exceptions.
State		
Washington State Endangered Species Act, Washington Administrative Code 232-12-297	WDFW	All state-listed threatened and endangered species. Associated recovery plans provide guidelines on management of these species.
Local		
Clallam County Critical Areas Ordinance No. 709, 2001	Clallam County	Habitat for threatened, endangered, and other sensitive species. Provides general guidance. Also provides specific buffers for bridge construction and other projects that are not relevant to the Makah EIS proposed action.

3.5.3 Existing Conditions

This following discussion is divided into three primary topics. It focuses on establishing a baseline of information for addressing EIS issues of concern including noise, disturbance, and other perturbations that may affect marine wildlife. Section 3.5.3.1 describes the marine mammal species that are known to occur in the project area. Section 3.5.3.2 provides an overview of other marine wildlife species in the project area. Both sections address ESA-listed species as well as other species in the project area. Section 3.5.3.3 discusses the sensitivity of marine mammals and other wildlife species to noise and other disturbance both above and below the surface of the water.

3.5.3.1 Marine Mammals

Table 3-11 lists 29 species of marine mammals that breed, rest within, or migrate through the waters off the Washington coast (NMFS 1992; NOAA 1993). Descriptions of the state and federal threatened or endangered species followed by common and then, to a lesser extent, uncommon species are provided below in this section. Full descriptions of these species are in Angliss and Outlaw (2005), Carretta et al. (2006), Forney et al. (2000), NMFS (1992), Ferrero et al. (2000), Haley (1986), Perrin et al. (2002), and Nowak et al. (2003), with specific information on their use off the Washington coast by Brueggeman et al. (1992), Calambokidis et al. (2004b), and Green et al. (1993).

TABLE 3-11. MARINE MAMMALS THAT OCCUR ALONG THE WASHINGTON COAST AND THEIR FEDERAL/STATE STATUS

SPECIES	*SCIENTIFIC NAME*	RELATIVE ABUNDANCE	PRIMARY HABITAT	PRIMARY PREY	SEASON(S) PRESENT	FEDERAL/ STATE STATUS
Harbor seal	*Phoca vitulina*	Common	Coastal/ continental	Fish	Year-round	
California sea lion	*Zalophus californianus*	Common	Coastal/shelf	Fish	Summer/ spring	
Steller sea lion	*Eumetopias jubatus*	Common	Coastal/shelf	Fish	Year-round	Federally/state threatened
Northern elephant seal	*Mirounga angustirostris*	Common	Shelf/slope	Fish/squid/ crab	Summer/fall	
Northern fur seal	*Callorhinus ursinus*	Common	Offshore/ slope	Fish/squid	Year-round	Federally depleted
Dall's porpoise	*Phocoenoides dalli*	Common	Shelf/slope/ offshore	Fish	Year-round	
Harbor porpoise	*Phocoena phocoena*	Common	Shelf	Fish/squid	Year-round	
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	Common	Slope/ offshore	Fish	Year-round	
Northern right whale dolphin	*Lissodelphis borealis*	Common	Slope/ offshore	Fish/squid	Year-round	
Common dolphin	*Delphinus delphis*	Uncommon	Offshore	Squid/fish	Unknown	

Species	Scientific Name	Relative Abundance	Primary Habitat	Primary Prey	Season(s) Present	Federal/ State Status
Striped dolphin	*Stenella coeruleoalba*	Uncommon	Shelf/offshore	Fish/squid/ zooplankton	Unknown	
Risso's dolphin	*Grampus griseus*	Common	Slope	Squid	Year-round	
Killer whale[1]	*Orcinus orca*	Common	Shelf/slope	Fish/marine mammals	Year-round	Federally/state endangered[1]
False killer whale	*Pseudorca crassidens*	Uncommon	Offshore	Fish	Unknown	
Pilot whale	*Globicephala macrorhynchus*	Uncommon	Shelf/offshore	Fish/ octopus	Unknown	
Pygmy sperm whale	*Kogia breviceps*	Uncommon	Offshore	Octopus/ fish/squid	Unknown	
Gray whale	*Eschrichtius robustus*	Common	Coastal/shelf	Crustaceans	Year-round	
Humpback whale	*Megaptera novaeangliae*	Uncommon	Shelf/slope	Zooplankton/ fish	Spring to fall	Federally/state endangered
Sperm whale	*Physeter macrocephalus*	Uncommon	Slope/ offshore	Squid/fish	Spring to fall	Federally/state endangered
Minke whale	*Balaenoptera acutorostrata*	Common	Shelf	Fish/squid	Year round	
Fin whale	*Balaenoptera physalus*	Uncommon	Slope/ offshore	Fish/ zooplankton	At least winter	Federally/state endangered
Blue whale	*Balaenoptera musculus*	Uncommon	Slope/ offshore	Zooplankton	Unknown	Federally/state endangered
Sei whales	*Balaenoptera borealis*	Uncommon	Offshore	Zooplankton	Unknown	Federally/state endangered
Right whale	*Balaena glacialis*	Rare	Shelf	Zooplankton	At least spring	Federally/state endangered
Baird's beaked whale	*Berardius bairdii*	Rare	Shelf/offshore	Squid/ octopus/fish	At least fall	
Curvier beaked whale	*Ziphius cavirostris*	Rare	Offshore	Squid/fish	Unknown	
Hubb's beaked whale	*Mesoplodon carlhubbsi*	Rare	Offshore	Squid/fish	Unknown	
Stejneger's beaked whale	*Mesoplodon stejnegeri*	Rare	Offshore	Squid/fish	Unknown	
Sea otter (Washington stock)	*Enhydra lutris kenyoni*	Common	Coastal	Invertebrates	Year round	State endangered

[1] NMFS recently listed the southern resident killer whale population as endangered. Transient and offshore killer whales are not listed under ESA, but occur in the project area.

Source: Haley 1986; Calambokidis et al. (2004b), Brueggeman et al. (1992); NMFS (1992); Green et al. (1993); Carretta et al. (2006), Anglis and Outlaw (2005), Ferrero et al. 2000; Forney et al. 2000.

3.5.3.1.1 ESA-Listed Marine Mammal Species

Steller Sea Lion

The eastern stock (identified as a distinct population segment) of Steller sea lions extends from California to 144^{o} W longitude (at Cape Suckling, AK) at the northern end of southeast Alaska and includes Washington and Oregon. Based on extrapolations from pup surveys in 2002, the stock is estimated to be 44,996 animals with a PBR of 1,967 (Angliss and Outlaw 2005). This stock is listed as threatened under ESA (55 FR 12645, April 5, 1990). Overall the stock has been increasing at about 3.1 percent per year since the 1970s with the population more than doubling in size by 2002, principally in Southeast Alaska (Pitcher et al. *in press*).

The Steller sea lion occurs year around in Washington State, with peak numbers in late summer, fall, and winter (NMFS 1992). There are no rookeries in Washington State, but one or two pups infrequently are born at haulout sites on the Washington coast; it is unlikely that these pups survive (Gearin 2007). The closest rookeries are in northern British Columbia and central Oregon, where pupping occurs from late May to early July. Within Washington, Steller sea lions occur primarily in the nearshore zone and continental shelf zone, with smaller numbers in the inside waters of the Strait of Juan de Fuca and Puget Sound.

There are several commonly used haulout sites near the project area (Gearin and Scordino 1995), including near Neah Bay during all months of the year, but they are more commonly observed during late August through April. The west end of Tatoosh Island is a year-round haulout site with numbers peaking during fall and winter. To the south of Cape Alava, large numbers exceeding 1,000 Steller sea lions have been observed hauled out on the Bodelteh Islands and on Guano Rock (Figure 3-2). Farther to the south, large numbers also haul out on Carroll Island, along with California sea lions, and at the Split Rock complex north of Taholah.

Steller sea lions are opportunistic predators, feeding primarily on a wide variety of fish and cephalopods. Some of the more important prey in Washington include Pacific whiting, Pacific herring, spiny dogfish, skates, salmon, and smelts (Gearin et al. 1999). Steller sea lions have been known to prey infrequently on harbor seal, fur seal, ringed seal, and possibly sea otter pups (NMML 2007). Before 2005, Makah tribal regulations explicitly advised subsistence hunters to take care in hunting California sea lions to avoid Steller sea lions (Sepez 2001); since 2005, the Tribe has not authorized direct subsistence harvest of any marine mammals.

Killer Whale

There are three ecotypes of killer whales in the North Pacific Ocean: resident, transient, and offshore whales (Bigg et al. 1990; Ford et al. 2000). Resident killer whales congregate in relatively large groups in coastal areas where they forage primarily on fish. Transient killer whales, whose range extends over a broader area, primarily hunt marine mammals (Krahn et al. 2004; Baird et al. 1992). In a recent study by Wade et al. (2006), gray whales accounted for approximately 8 percent of 466 observed predation events by transient killer whales off the west coast of North America; calves and juvenile gray whales were taken preferentially over adults. Transient pods are usually smaller than resident pods, and they typically have different dorsal fin shapes and saddle patch pigmentation than resident pods. Little is known about offshore killer whales, but their groupings are large, they range from Mexico to Alaska, and their prey includes fish (Ford et al. 2000; Krahn et al. 2002, 2004). All three ecotypes of killer whales were seen each year during ship surveys from the summer of 1995 to 2002, including southern and northern residents (Calambokidis et al. 2004b). They reported 14 sightings of 124 animals; three of these sightings were of large groups between 20 and 35 animals, and the rest were fewer than 10. Killer whales were widely distributed across different habitats; animals were sighted both close to and far from shore and in fairly shallow and deep water.

As summarized by Carretta et al. (2006), most sightings of the Eastern North Pacific southern resident stock of killer whales have occurred in the summer in inland waters of Washington and southern British Columbia. Pods belonging to this stock have, however, also been sighted in coastal waters off southern Vancouver Island and Washington (Bigg et al. 1990; Ford et al. 2000). The complete winter range of this stock is uncertain. Of the three pods comprising this stock, one (J1) is commonly sighted in inshore waters in winter, while the other two (K1 and L1) apparently spend more time offshore (Ford et al. 2000). Pods K1 and L1 are often seen entering the inland waters of Vancouver Island from the north — through Johnstone Strait — in the spring (Ford et al. 2000), suggesting that they may spend time along the entire outer coast of Vancouver Island during the winter. In 1993, the three pods comprising this stock totaled 96 killer whales (Carretta et al. 2006). The population increased to 99 whales in 1995, then declined to 79 whales in 2001 before increasing slightly to 84 whales in 2004 (Ford et al. 2000; Center for Whale Research 2005). Ninety animals were documented in the J, K, and L pods in 2005 (Center for Whale Research 2005). The minimum population estimate for the eastern North Pacific southern resident stock of killer whales is 84 animals with a PBR of 0.8 whale per year. The southern residents primarily feed on salmon returning to rivers in Washington and southern British Columbia.

NMFS listed the southern resident killer whale distinct population segment as endangered in 2005 (70 FR 69903, November 18, 2005). Listing factors included reduced quantity and quality of prey, persistent pollutants that could cause immune or reproductive system dysfunction, oil spills, and noise and disturbance from vessel traffic. Additionally, the small size of this stock makes it potentially vulnerable to inbreeding that could cause a major population decline (70 FR 69903, November 18, 2005). In November 2006, NMFS designated critical habitat for the southern resident killer whales (71 FR 69054, November 29, 2006). This designation includes approximately 2,500 square miles of Puget Sound, including the entire Strait of Juan de Fuca in the project area. Areas with water less than 20 feet deep are not proposed. The primary constituent elements for the southern resident killer whale critical habitat are (1) water quality to support growth and development; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging.

Humpback Whale

The humpback whale is listed as endangered throughout its range (35 FR 8491, June 2, 1970). Three North Pacific Ocean populations of humpback whales are currently recognized, based on predominant migration patterns and destinations (there is no perfect correlation between the breeding and feeding areas): (1) the eastern North Pacific stock, which spends winter and spring in coastal Central America and Mexico, then migrates to the coast of California and to southern British Columbia in summer and fall; (2) the central North Pacific stock, which spends winter and spring off the Hawaiian Islands, then migrates to northern British Columbia/Southeast Alaska and Prince William Sound west to Kodiak in summer and fall; and (3) the western Pacific stock, which spends winter and spring off of Japan, then probably migrates to waters west of the Kodiak Archipelago in summer and fall (Carretta et al. 2006). Other humpbacks also spend winter and spring in the waters of Mexico's offshore islands, but the migratory destination of these whales is not well known. The eastern North Pacific population is the stock that most commonly occurs in the project area during summer and fall. Some individuals from the central North Pacific stock may also appear near or in the project area during the summer and fall; there is some overlap of this stock with the summer and fall distribution of the eastern North Pacific stock.

The minimum population estimate for humpback whales in the eastern North Pacific stock is based on 2002/2003 abundance estimates from line-transect and photo-identification mark-recapture studies (Calambokidis and Barlow 2004; Calambokidis et al. 2004b) and is approximately 1,158 whales. The population is growing from approximately 6 to 7 percent, and the calculated PBR is 2.3 whales per year (Carretta et al. 2006).

Seventeen of 191 whales (9 percent) photo-identified by Calambokidis et al. (2004b) off northern Washington had also been photographed off California and Oregon. Interchange of whales seen off northern Washington and other feeding areas to the south decreased as distance among feeding areas increased. Approximately 10 percent of the whales that were identified off Oregon were also photographed off northern Washington (Calambokidis et al. 2004b).

Humpbacks are generally seen off the coast of Washington from May to November, although they have also been seen earlier in the spring and later in the winter (Shelden et al. 2000) with the highest numbers in June and July. Aerial surveys conducted by Brueggeman et al. (1992) off the coasts of Oregon and Washington recorded 36 groups of 68 humpbacks between May and November, and Green et al. (1993) reported 50 groups of 77 humpbacks between March and April. Humpbacks primarily occurred near the edge of the continental slope and deep submarine canyons (Astoria, Grays, and Nitinat Canyons) where upwelling concentrates zooplankton near the surface for feeding (Brueggeman et al. 1992). Brueggeman et al. (1992) observed that humpbacks were most abundant between May and September, but did not observe any during winter and did not sight any calves. Humpbacks typically are not sighted in winter, but Shelden et al. (2000) did observe some off the coast of Washington in late fall and winter 1998 and 1999; 5 humpback whales were sighted between Carroll Island and Cape Flattery in October, 26 humpbacks (in 12 groups) were sighted in November, and 18 humpbacks (10 groups) were sighted in December. Shelden et al. (2000) concluded that the late occurrence of humpbacks in Washington waters could be due to reoccupation of habitat subsequent to commercial whaling, or to abundance of prey available.

Calambokidis et al. (2004b) reported sightings of humpback whales during ship surveys conducted from 1995 to 2002 off the northern Washington coast within the boundaries of the Olympic Coast National Marine Sanctuary. Humpbacks were the most common species seen with 232 sightings of 402 animals and more than 191 unique individuals; the largest numbers were seen in 2002 when there were 79 sightings of 139 individuals. Group sizes ranged from one to eight animals. Only six calves were recorded from the ship surveys, probably because it was difficult to identify calves at the distance at which most sightings occurred. Sightings were concentrated between Juan de Fuca Canyon and the outer edge of the continental shelf, an area called the Prairie. A small area east of the mouth of Barkley Canyon and north of Nitnat Canyon where the water was approximately 410 to 475 feet deep had numerous sightings in all years. Smaller numbers of humpback whales were also seen on Swiftsure Bank.

Sperm Whale

The sperm whale is listed as endangered throughout its range (35 FR 8491, June 2, 1970). Sperm whales are widely distributed in the pelagic regions of the North Pacific Ocean where they prey on deepwater squid (Gosho et al. 1984). Sperm whales breed in the lower latitudes (south of 40 degrees N) in winter and then migrate northward to summer feeding areas. Whaling records indicate that about eight sperm whales were harvested annually by whalers at the Bay City, Washington, whaling station during its 15 years of operation in the early 1900s, suggesting that sperm whales were consistently present off the coast at that time. Ship surveys by Calambokidis et al. (2004b) from 1995 to 2002 recorded no sperm whales. However, in surveys Brueggeman et al. (1992) conducted, 24 groups of 36 sperm whales were recorded off the Oregon and Washington coasts. Most were encountered in the deeper offshore waters, except for a relatively small number found in continental slope waters. Brueggeman et al. (1992) observed sperm whales during spring through fall, but not in winter. The highest single-day count was 13 sperm whales in September 1990. Green et al. (1993) reported seven sperm whales in five groups off the Oregon and Washington coasts between March and May. The most recent estimate of abundance is 1,233 sperm whales reported by Barlow (2003) for California, Oregon, and Washington; the minimum population estimate is 885 animals with a PBR of 1.8 whales per year (Carretta et al. 2006). Population trends for the California-Oregon-Washington population are uncertain, though the larger eastern North Pacific population appears to be increasing slightly. The information indicates that relatively small numbers of sperm whales are present in the deep waters off the Washington coast from spring through fall.

Fin Whale

The fin whale is listed as endangered throughout its range (35 FR 8491, June 2, 1970). Three stocks are generally recognized off the United States west coast: (1) the California/Oregon/ Washington stock; (2) the Hawaii stock; and (3) the Alaska stock (Carretta et al. 2006). Fin whales of the California/Oregon/Washington stock are year-round residents off the coast of California; they summer off the Oregon coast and may pass by the Washington coast. They are a pelagic species, seldom found in waters shallower than 656 feet. Ship surveys by Calambokidis et al. (2004b) from 1995 to 2002 indicated no fin whales. Aerial surveys Brueggeman et al. (1992) conducted off the Oregon and Washington coasts indicated 13 groups of 27 fin whales between

June and January. All of the fin whales were observed off the Oregon coast, with all but five whales in waters on the continental slope (656 to 6,562 feet deep). The whales that were not observed in continental slope waters included two seen about 124 miles offshore in November and three viewed on the continental shelf just south of the Columbia River in January. The former group was traveling south, suggesting they were migrating back to the wintering grounds. Except for these two groups of whales, all the other whales were observed during June and July. No calves were observed with any of the whales. Green et al. (1993) reported sighting two fin whales during aerial surveys off the coast of Oregon and Washington between March and May in 1992, but did not report the location. An estimated 3,270 fin whales occur off the coasts of California, Oregon, and Washington during summer and fall, based on shipboard surveys in 1996 by Barlow and Taylor (2001) and in 2001 by Barlow (2003). The minimum population estimate from the 1996 and 2001 surveys was 2,541 with a PBR of 15 whales per year (Carretta et al. 2006). Fin whales can be distinguished from other mysticetes (baleen whales, such as gray, humpback, sei, bowhead, and fin whales) by distinct coloration on the head. The pigmentation differs on the left side and right side, as well as on the dorsal and ventral surface. On the left side, both the dorsal and ventral surfaces are dark slate. On the right side, the dorsal surface is gray and the ventral surface is white (Aguilar 2002). Fin whales in the northern hemisphere typically feed on small schooling fish, planktonic crustaceans, small squid, and zooplankton (Aguilar 2002; Nowak 2003). Based on the Oregon sightings near Washington, it is possible that relatively small numbers of fin whales pass through Washington during winter while migrating south.

Blue Whale

Blue whales are the largest animal, with recorded lengths of from 104 to 107 feet. Females are typically larger than males, and southern hemisphere whales are larger than those of the northern hemisphere (the largest recorded was 92 feet) (Sears 2002). The species is listed as endangered under the ESA (35 FR 8491, June 2, 1970) throughout the range. Three stocks of blue whales inhabit United States waters: the western North Atlantic stock, the Hawaiian stock, and the eastern North Pacific stock. The eastern North Pacific stock feeds in California waters in summer and fall (from June to November) and migrates south to productive areas off Mexico and as far south as the Costa Rica Dome in winter and spring (Angliss and Outlaw 2005; Carretta et al. 2006). Blue whales are very rarely seen off the Oregon coast, and there have been no recent sightings of blue whales off the Washington coast (Calambokidis and Barlow 2004; Calambokidis et al. 2004b; Carretta et al. 2006). Blue whales are found in coastal and deep offshore waters, but also occur on the continental shelf. Blue whales appear to feed almost exclusively on krill (which are relatively large euphausiid crustaceans) worldwide in areas of cold current upwelling (Nowak 2003; Sears 2002). Some other prey species, including fish and copepods, have been reported as being consumed by blue whales, but these prey are unlikely to contribute substantially to the diet of blue whales (NOAA Fisheries Office of Protected Resources 2006). The best estimate of the eastern North Pacific blue whale stock is 1,744 individuals (Calambokidis and Barlow 2004; Carretta et al. 2006). The minimum population size is 1,384 with a PBR of 1.4 whales per year (Carretta et al. 2006). There is some indication that blue whales increased in abundance in California coastal waters between 1979/1980 and 1991 and between 1991 and 1996. Population estimates in 2000/2001 suggest a decline when compared to previous years. Due to the small sample sizes used in these estimates, the accuracy of this apparent decline is uncertain. Blue whales would not be expected to occur in the project area.

Sei Whale

The sei whale is listed as endangered throughout its range under the ESA (35 FR 8491, June 2, 1970). Sei whales are uncommon off California, Oregon, and Washington (Carretta et al. 2006). Two sei whales were tagged off California in 1962 and 1965 and later commercially taken off the Washington coast in 1969 and British Columbia in 1966 (Rice 1974). No sei whales were observed during aerial surveys Brueggeman et al. (1992) conducted off the coast of Oregon or Washington in 1991 or in 1992, during surveys Green et al. (1993) conducted, or during ship surveys Calambokidis et al. (2004b) conducted from 1995 to 2002. Sei whales are primarily found offshore in deeper water and are not associated with coastal waters. Sei whales primarily prey on copepods and amphipods, but also take euphausiids and small fish (Nowak 2003). The most recent abundance estimate for sei whales off California, Oregon, and Washington out to 300 nautical miles from the coast is 56 whales based on shipboard surveys in 1996 and 2001 (Barlow 2003). Consequently, sei whales would not be expected in the project area.

Right Whale

The North Pacific right whale is listed as an endangered species under the ESA (35 FR 8491, June 2, 1970). It is the least abundant of all large whale species and most marine mammal species. Right whales are found in three general regions: the North Atlantic, the North Pacific, and the Southern Hemisphere. The North Pacific stock has two populations: a Sea of Okhotsk stock and an eastern North Pacific stock. The range of the latter population is thought to include the west coast from Mexico to Alaska (Brownell et al. 2001; Clapham et al. 2004), although few have been observed off the Washington coast. A group of eight right whales was reported off Destruction Island, Washington, in April 1959 (Fiscus and Niggol 1965). The most recent sighting of a single whale off Cape Elizabeth occurred on May 24, 1992 (Rowlett et al. 1994). Recent extensive ship surveys in western Alaska indicated no sightings of right whales (Zerbini et al. 2006), nor were any seen off Washington during ship surveys from 1995 to 2002 (Calambokidis et al. 2004b). Right whales generally feed on zooplankton, including copepods, near the coast and continental shelf edge. Reliable estimates of population size and trends are not known (Angliss and Outlaw 2005), but observers believe that the North Pacific stock numbers 100 to 200 animals, a small fraction of the pre-whaling abundance (Nowak 2003). This information suggests that a small number of right whales could occur off the Washington coast; however, the probability is low (Carretta et al. 2006).

3.5.3.1.2 Common Species off Washington Coast

Harbor seals, California sea lions, northern fur seals, northern elephant seals, Dall's porpoises, harbor porpoises, Pacific white-sided dolphins, Risso's dolphins, northern right whale dolphins, and minke whales are common in the project area. A short description of these species is provided below. These species could occur in the project area during the proposed whale hunt.

Harbor Seal

For management purposes, three harbor seal stocks are recognized along the west coast of the continental United States, including the California stock, outer coast of Oregon and Washington, and Washington inland waters stock (Carretta et al. 2006) Harbor seals from the last two stocks occur within the project area. Both occur principally in the nearshore zone and are the most common marine mammal in Washington (NMFS 1992). Recent counts show 10,430 seals off the Washington coast and 5,735 in Oregon, totaling 16,165 harbor seals for the outer coast of Oregon and Washington stock; the minimum population is estimated at 22,380 (Carretta et al. 2006; Jeffries et al. 2003). The mean number of seals in the Washington inland waters stock was estimated to be 9,550 in 1999 with a minimum population size of 12,844 seals; more recent estimates are not available (Carretta et al. 2006) The combined PBR for the coastal (1,343) and inland stocks (771) is 2,114 harbor seals. The species occurs year-round in Washington. Harbor seals give birth on shore and nurse their pups for 4 to 5 weeks. After the pups are weaned, they disperse widely in search of food. Pupping along the outer coast of Washington and the Strait of Juan de Fuca occurs in May through July, and additionally in August in the strait. Breeding occurs in the water shortly after the pups are weaned. The Makah U&A contains at least

32 harbor seal haulout sites (Gearin and Scordino 1995). This area is subdivided for convenience into three areas (western Strait of Juan de Fuca complex, Cape Flattery Complex, and the Cape Alava Complex) with variable harbor seal densities within each complex. The western Strait of Juan de Fuca complex has the lowest density (number of seals per nautical mile); the Cape Alava area has the highest density and number of pups (Gearin and Scordino 1995; Jefferies et al. 2000). Common prey include sole, flounder, sculpin, hake, cod, herring, squid, octopus, and, to a lesser degree, salmon (Jeffries and Newby 1986; Orr et al. 2004). Before 2005, the Makah Tribal Council promulgated regulations allowing tribal members to exercise treaty rights for subsistence harvest of harbor seals. An estimated 5 to 15 seals may have been taken for subsistence per year by northwest tribes (Carretta et al. 2006).

California Sea Lion

The California sea lion includes three subspecies of which *Z. c. californianus* (found from southern Mexico to southwestern Canada) occurs in the project area. California sea lions breed on islands in three geographic regions that are used to separate this subspecies into three stocks: (1) the United States stock, which begins at the United States/Mexico border and extends northward into Canada; (2) the Western Baja California stock, which extends from the United States/Mexico border to the southern tip of the Baja California Peninsula; and (3) the Gulf of California stock, which includes the Gulf of California from the southern tip of the Baja California peninsula (Carretta et al. 2006). California sea lions occur seasonally in Washington waters (NMFS 1992). Based on extrapolations from pup counts, the population is estimated between 237,000 and 244,000 sea lions, and it is growing at 5.4 to 6.1 percent per year (Carretta et al. 2006). The minimum population estimate is 138,881 sea lions with a PBR of 8,333 per year (Carretta et al. 2006). Males migrate northward along the coast following the summer breeding season in California. Beginning in August, male California sea lions appear along the outer Washington coast principally in the nearshore and continental shelf zones. Some move into Puget Sound and British Columbia. California sea lions remain in Washington waters through the winter and early spring before returning to California in May and June (Gearin and Scordino 1995; Jeffries et al. 2000). The migration can be characterized as a feeding migration consisting primarily of adult and sub-adult males. California sea lion females and younger animals less than four to five years old tend to remain near the home rookeries throughout the year, or move only as far north as central California. California sea lions are common around Neah Bay during fall, winter, and spring. They are also common inside Neah Bay in April and May; a group of 5 to 10 sea lions feeds on fish scraps around the harbor, and groups of 50 to 100 animals reside on the west end of Tatoosh Island. Within the project area, small numbers of California sea lions are often sighted in Makah Bay and to the south at Cape Alava where larger numbers haul out at west Bodelteh Island during migration (Gearin and Scordino 1995; Jeffries et al. 2000). As many as 4,000 to 5,000 California sea lions have been observed on the Bodelteh Islands during the fall. Farther south on Carroll Island, 200 to 300 sea lions may haul out during the migration peak. Little is known of their diet on the Washington coast, but in Puget Sound they feed primarily on Pacific whiting, Pacific herring, salmonids, dogfish sharks, and squid (Gearin and Scordino 1995). Before 2005, the Makah Tribe promulgated regulations allowing Tribe members to exercise treaty rights for subsistence harvest of sea lions. Up to two sea lions were taken for subsistence each year (Carretta et al. 2006).

Northern Elephant Seal

Northern elephant seals, estimated to number 101,000 animals, breed off Mexico and California during winter and move northward to feed from Baja California to northern Vancouver Island and far offshore of the Gulf of Alaska and Aleutian Islands (Nowak 2003; Carretta et al. 2006). Populations of northern elephant seals in the United States and Mexico all originally derived from a few tens or a few hundreds of individuals surviving in Mexico after they were nearly hunted to extinction. The California breeding population is now demographically isolated from the Baja California population and is considered a separate stock for management purposes (Carretta et al. 2006). Elephant seals occur off the Washington coast primarily during summer and early fall (Brueggeman et al. 1992) and were the second most common pinniped sighted during summer during ship surveys off the Washington coast from 1995 to 2002 (Calambokidis et al. 2004b). In contrast, all the elephant seals Brueggeman et al. (1992) observed from mid-fall through spring were off the Oregon coast. Most of the elephant seals they encountered were over the continental shelf and slope, at a mean distance of almost 40 miles from the coast. No haulout sites occur in Washington. Elephant seals prey on deepwater and bottom-dwelling organisms, including fish, squid, crab, and octopus (Nowak 2003).

Northern Fur Seal

The eastern Pacific stock of the northern fur seal is estimated to number 688,028 animals; the minimum population estimate is 676,540 with a PBR of 14,546. Based on significant declines in abundance during the 1960s and 1970s, the Pribilof Islands population was listed as depleted under the MMPA in 1984 because population levels had declined to levels lower than 50 percent of those observed in the 1950s (1.8 million animals; 53 FR 17888 18 May 1988) (Angliss and

Outlaw 2005). Causes of decline and current threats are uncertain but may include climate change, vessel and human presence, depletion of prey species, predation, and environmental contamination (NMFS 2007c).

Fur seals are a seasonal migrant off the Washington coast, and they do not breed or haul out (although individuals may infrequently be seen on land mixed with sea lions) in Washington (Angliss and Outlaw 2005). The closest rookeries are in the Bering Sea (Pribilof Islands and Bogoslof Island) and the Channel Islands (San Miguel Island) of California. During the July-August breeding season, most of the population is found on the Pribilof Islands. Females and juveniles of both sexes migrate south in fall into waters over the continental shelf and slope of the eastern North Pacific Ocean, while adult males generally stay in Alaska waters (Gentry 2002). The migration ranges as far south as 30 to 32 degrees north latitude off southern California and northern Baja, Mexico. Fur seals begin the return migration northward in mid-spring; by early summer, most have returned to their breeding islands (Gentry 2002; Nowak 2003).

In Washington, Brueggeman et al. (1992) reported that northern fur seals primarily inhabited the deep offshore waters, but they also used the continental shelf and slope waters. They were observed off the Washington coast year-round, but most individuals (more than 90 percent) were encountered from January through May. Sightings of northern fur seals in the Strait of Juan de Fuca or Puget Sound are rare, but they do occur occasionally (Gearin and Scordino 1995). They feed on walleye pollock, Pacific herring, capelin, squid, and small schooling fishes (Kajimura 1984). Pribilof Islands Aleut Natives take approximately 600 to 800 subadult male fur seals/year for subsistence use (Angliss and Outlaw 2005). Makah Tribe hunters took fur seals from canoes in the open ocean in the late 1800s and into the 1900s, but they do not currently hunt them, nor have they recently been taken incidental to the Makah set net fisheries (Swan 1883; Swan 1887; Sepez 2001; Pamplin 2005a).

Northern Sea Otter

Sea otters occurred historically along the outer coast of Washington; the population was severely over-hunted in the late mid-1700s to 1800s and extirpated in the Pacific Northwest by 1920 (NMFS 1992; Jameson 1995). The last known native sea otters in Washington were taken in Willapa Bay in 1910 (Scheffer 1940). In 1969 and 1970, 59 northern sea otters were transplanted to Washington from Amchitka Island, Alaska (Lance et al. 2004). Although the otters off Washington State are descended from the Amchitka Island sea otters and are, thus, related to the southwest Alaska distinct vertebrate population segment recently listed as threatened under ESA

(70 FR 46366, August 9, 2005), they are geographically isolated from the southwest Alaska population by hundreds of kilometers and are not included in the listing. Sea otters off the Washington coast have been listed as a Washington State endangered species since 1981, due to small population size, restricted distribution, and vulnerability (Lance et al. 2004).

The FWS has conducted cooperative sea otter surveys with WDFW since 1985. In 1985, 65 sea otters were counted, increasing to 276 sea otters in 1991, 814 sea otters in 2005, and 790 sea otters in 2006 (Jameson and Jeffries 2005; Jameson and Jeffries 2006). Laidre et al. (2002) estimated the carrying capacity of sea otters at 1,836 individuals (95 percent confidence interval from 1,386 to 2,286), based on an assumption that sea otters will reoccupy most of their historic habitat along the outer Washington coast (excluding reoccupation of the Columbia River, Willapa Bay, and Grays Harbor estuaries due to significant human alterations and use) and eastward into the Strait of Juan de Fuca as far as Protection Island. The FWS and WDFW uses these estimates in stock assessment reports and recovery plans.

The current sea otter population range extends as far south as Cape Elizabeth on the outer Olympic Peninsula Coast to as far north as Pillar Point, with concentrations near Duk Point, Cape Alava, Sand Point, Cape Johnson, Perkins Reef, and Destruction Island (Figure 3-2). More than half of the population occurs south of La Push, with the single largest concentration of otters located at Destruction Island (Jameson and Jefferies 2005). Sea otters occur nearshore throughout the project area and are being seen more consistently, in lower numbers, in the Strait of Juan de Fuca as far inland as Port Townsend. A large group of males moved into the Strait of Juan de Fuca during winter in the 1990s (Lance et al. 2004), but have not done so since 2000. Sea otters generally inhabit shallow coastal waters less than 1 mile from shore, but small numbers of sea otters have been found out to at least 3 miles from the Cape Alava area. In Washington, sea otters generally stay in relatively shallow waters and forage on a variety of marine invertebrates, including sea urchins, throughout the entire depth range from intertidal areas out to at least 20 fathoms (120 feet) (Lance et al. 2004). Sea otters pup in late winter and early spring, and the pups are weaned in late summer and early fall. Reproduction occurs throughout the area (Lance et al. 2004). Post-weaning mortality is higher for males than females and increases as resources become limited (Estes and Bodkin 2002). Low levels of mortality occur in adult females as a result of injury by males during copulation (Estes and Bodkin 2002). Sea otters are preyed upon by white sharks, killer whales, and, infrequently, Steller sea lions. Of the marine mammals within the project area, they (and northern fur seals) are most susceptible to mortality caused by oil spills due to the importance of their fur in regulating metabolism (Ballachey et al.

1994). The expanding sea otter population has had a substantial impact on the Makah Tribe's sea urchin fishery (Pamplin 2005a). Two sea otters were taken incidental to the Makah set net fisheries in 2004, and none were taken in 2005 (Pamplin 2005a).

Harbor Porpoise

Two harbor porpoises stocks are recognized within the project area, the Washington inland waters stock and the coastal Oregon/Washington stock. Extensive interchange is likely between the two stocks. The former is estimated at 3,509 animals with a minimum population estimate of 2,545 and a PBR of 20 porpoises per year (Carretta et al. 2006). The coastal Oregon/Washington stock is estimated to number 39,586 animals with a minimum population estimate of 28,967 and a PBR of 290 per year (Carretta et al. 2006). This stock is present year-round off the Washington coast, and those in the inland stock are present throughout most of the year in inland waters (Carretta et al. 2006). Numbers of harbor porpoises are particularly high in the fall and winter, low in the summer, and intermediate in the spring (Brueggeman et al. 1992; Carretta et al. 2006). They are widespread throughout the inland and coastal waters of Washington with the exception of southern Puget Sound (NMFS 1992). Scheffer and Slipp (1948) provide a historical account of this species in Washington.

Harbor porpoises are known to calve and breed in Washington, and they generally give birth in summer from May through July. Calves remain dependent for at least six months (Leatherwood et al. 1982). Harbor porpoise are usually shy and avoid vessels; thus, they are difficult to approach. The species frequents inshore areas, shallow bays, estuaries, and harbors. Harbor porpoises are found almost exclusively shoreward of the 100-fathom (600-foot) contour line along the Pacific coast, with the vast majority found inside the 25-fathom (150-foot) curve (Gearin and Scordino 1995; Green et al. 1992). The primary prey of harbor porpoise are small fish and squid typically found in shallow waters. Bottom-dwelling fishes and small pelagic schooling fishes with high lipid content, including herring and anchovy, are common prey (Bjorge and Tolley 2002; Leatherwood and Reeves 1986). Small numbers of harbor porpoise have recently been taken incidentally in Makah set net fisheries, including two individuals in 2004 and none in 2005 (Gearin et al. 2000; Carretta et al. 2006; Pamplin 2005a).

Dall's Porpoise

Dall's porpoises are common off the Washington coast, but their distribution and abundance are variable and likely linked to variable oceanographic conditions (Carretta et al. 2006). They are probably the most widely distributed cetacean in the temperate and subarctic regions of the North

Pacific and Bering Sea (Leatherwood et al. 1982). An estimated 99,517 Dall's porpoises occur in the California, Oregon, and Washington stock with a minimum population estimate of 75,915 and a PBR of 729 animals per year (Carretta et al. 2006). They were the most common small cetacean observed in ship surveys off the Washington coast from 1995 to 2002 with 115 sightings of 406 animals (Calambokidis et al. 2004b). Brueggeman et al. (1992) reported 152 groups containing 341 Dall's porpoise, including four calves, during surveys off the coast of Oregon and Washington. Porpoises were most common during fall, least common during winter, and intermediate in occurrence during spring and summer, although encounter rates were not substantially different among seasons, suggesting that a resident population occurs off the coast of Oregon and Washington. Encounter rates were highest over the continental slope, lowest on the continental shelf, and intermediate in offshore waters. They rarely occurred in shallow coastal waters. Dall's porpoises were observed in small groups, which are consistent with observations reported in other studies, although aggregations of at least 200 individuals have been reported. They occur only rarely in groups of mixed species, although they are sometimes seen in the company of harbor porpoises and gray whales (Klinowska 1991; Reeves and Leatherwood 1994). Dall's porpoises apparently feed at night. They depend, to some degree, on the deep scattering ocean layer, through which fauna travel upwards each night from the deeper parts of the ocean's water column. Prey species, as determined from stomach contents, include squid and schooling fishes (Jefferson 2002; Klinowska 1991; Reeves and Leatherwood 1994). Killer whales and sharks are believed to be the primary natural predators of Dall's porpoises.

Pacific White-Sided Dolphin

The Pacific white-sided dolphin numbers an estimated 59,274 animals in the California, Oregon, and Washington stock, and it is one of the most abundant dolphins occurring year around off the coast of Washington (Brueggeman et al. 1992; Green et al. 1993; Carretta et al. 2006). The estimated minimum population level is 39,822 with a PBR at 382 dolphins per year (Carretta et al. 2006). Calambokidis et al. (2004b) recorded 28 sightings of 1,133 individuals in offshore waters during ship surveys off the Washington coast from 1995 to 2002. Some seasonal shifts occur off the coast of Oregon and Washington where dolphins are more common in offshore waters during spring. Their distribution shifts to continental slope waters during summer and fall, in rough synchrony with the movements of prey (VanWaerebeek 2002). Pacific white-sided dolphins may also move north to south seasonally (Forney and Barlow 1998). Peak abundances off the Oregon and Washington coast have been reported during May (Brueggeman et al. 1992; Buckland et al. 1993). Pacific white-sided dolphins consume a wide variety of fishes and cephalopods. Off the coast of British Columbia, herring was the most commonly occurring prey species, followed by salmon, cod, shrimp, and capelin (Heise 1997). Pacific white-sided dolphins have been known to occur in association with other marine mammals, including Dall's porpoise, Risso's dolphin, northern right whale dolphin, humpback whale, and gray whale (Brueggeman et al. 1992).

Risso's Dolphin

Risso's dolphins are distributed world-wide in warm-temperate and tropical waters along the continental shelf and slope edge. They are estimated to number 16,066 animals in the California, Oregon, and Washington area with a minimum population level of 12,748 and a PBR of 115 per year (Carretta et al. 2006). Risso's dolphins are common off the coast of Washington, where they are present year-round (Brueggeman et al. 1992). Nine sightings of 79 individuals were reported off the Washington coast during ship surveys from 1995 to 2002 (Calambokidis et al. 2004b). They are most common during spring and summer, least common in winter, and intermediate in occurrence during the fall (Brueggeman et al. 1992). Calves have been observed off the coast of Oregon and Washington during May, July, and November. Risso's dolphins primarily inhabit continental slope waters, but they also occur in lower numbers near the edge of the continental shelf. Risso's dolphins are consistently found on the continental slope and in shelf-edge waters throughout the year, suggesting there is no inshore to offshore movement pattern. However, there may be some seasonal north to south movement of Risso's dolphins between Oregon/Washington and California, based on the shifts in abundance between the two regions, possibly related to prey movements. Principal prey include cephalopods and fish, and limited behavioral research suggests that they feed primarily at night (Baird 2002; Nowak 2003). Risso's dolphins have been known to occur in association with other marine mammals, including Pacific white-sided and northern right whale dolphins (Brueggeman et al. 1992). No habitat issues are known to be of concern for this species, and human-caused mortality from commercial fishing and other sources is low (Carretta et al. 2006).

Northern Right Whale Dolphin

The California, Oregon, and Washington stock of the northern right whale dolphin is estimated at 20,362 animals with a minimum population estimate of 16,417 and a PBR of 164 dolphins per year (Carretta et al. 2006). The species is relatively common off the coast of Washington, which is toward the northern end of its range in the eastern North Pacific Ocean (Brueggeman et al. 1992). The northern right whale dolphin has been reported in Washington waters during all seasons except winter (Calambokidis et al. 2004b; Brueggeman et al. 1992). Numbers are highest in the fall and lowest during spring and summer. Use of the continental slope waters is considerably higher than the offshore water. Few dolphins occur in continental shelf waters. While northern right whale dolphins show a seasonal abundance pattern off the Washington coast that is somewhat opposite of the California pattern, it is not clear whether they move between the two areas. They are gregarious animals, often traveling in groups of 2,000 to 3,000 animals. The primary prey for this species include lanternfish, Pacific whiting, saury, mesopelagic fish, and squid (Lipsky 2002). The northern right whale dolphin has been frequently reported in association with Pacific white-sided dolphins (Leatherwood and Walker 1979; Brueggeman et al. 1992).

Minke Whale

There is no population estimate for minke whales in the North Pacific Ocean. The number off the coast of California, Oregon, and Washington is, however, estimated to be 1,015 whales based on vessel surveys between 1996 and 2001, with a minimum population size of 585 whales and a PBR of 5.8 whales per year (Carretta et al. 2006). Minke whales reside off the Washington coast year-round (Carretta et al. 2006). They typically occur as single animals, rather than in groups. Calambokidis et al. (2004b) reported four sighting of four individuals during ship surveys off the Washington coast from 1995 to 2002. Brueggeman et al. (1992) encountered four single minke whales, including three off the Oregon coast and one off the Washington coast. Most were on the continental shelf. Minke whales are also known to enter shallow bays and estuaries (Nowak 2003). Green et al. (1993) reported 10 groups of 12 minke whales off the Oregon and Washington coasts between March and May, but did not give their locations or indicate the distributions between the two states. Minke whales in the North Pacific typically prey on euphausiids, Japanese anchovy, Pacific saury, walleye pollock, small fish, and squid (Perrin and Brownell 2002; Nowak 2003).

3.5.3.1.3 Uncommon Marine Mammal Species off Washington Coast

Nine other uncommon marine mammals are occasionally sighted off the Washington coast. They include common dolphin, striped dolphin, false killer whale, pilot whale, pygmy sperm whale, Baird’s beaked whale, Curvier beaked whale, Hubb’s beaked whale, and Stejneger’s beaked whale (Table 3-11). Most of these species would be expected to occur seasonally in low numbers in deeper offshore waters. Brueggeman et al. (1992) observed a small number of false killer whales in the spring and beaked whales in the fall off the Washington coast. Five groups of 21 Baird’s beaked whales were also observed, but all were off the Oregon coast during spring and summer, suggesting low occurrence by this species in Washington waters. While there is some limited information on this group of uncommon marine mammals, little is known about their use of waters off the Washington coast. Summary information for each species can be found in Carretta et al. (2004), Angliss and Outlaw (2005), and Perrin et al. (2002).

3.5.3.2 Other Marine Wildlife

In addition to several species that are listed as threatened or endangered under ESA, the project area provides breeding and wintering habitat for numerous species of seabirds. The following sections provide descriptions of ESA-listed species and other seabird species. The latter discussion is organized by the habitat types with which the species are associated.

3.5.3.2.1 ESA-Listed Species

FWS (2004) identified the following ESA-listed marine wildlife species as occurring in the project area: brown pelican, bald eagle, and marbled murrelet. The agency also indicated that short-tailed albatross, leatherback sea turtles, green sea turtles, loggerhead sea turtles, and olive ridley sea turtles could occur in the area. Each of these species is described further below.

Brown Pelican

Brown pelicans are federally listed as endangered under ESA (35 FR 8491, June 2, 1970). In the project area, brown pelicans occur as non-breeding individuals, where they are present from June to October (Seattle Audubon Society 2005). They forage in marine waters, particularly in shallow areas, including bays and estuaries, and near offshore islands, spits, breakwaters, and open sand beaches. The birds rarely forage more than 40 miles from shore (FWS 2005b). Their diet consists of schooling anchovies, herring, Pacific mackerel, minnow, and sardines (Monterey Bay Aquarium 2003). Brown pelicans roost on offshore islands in the project area (Seattle Audubon Society 2005).

Marbled Murrelet

The marbled murrelet is federally listed as threatened under the ESA (57 FR 45328, October 1, 1992). This species nests in mature and old-growth forests and forages in marine waters. Nearshore marine waters within 1.2 miles are considered essential to the recovery of the species (FWS 1997). Newer information indicates murrelets occur out to 5 miles from shore with the highest mean densities closer to shore (Raphael et al. 2007). Critical marine foraging habitat includes “proximity of old-growth forests, distribution of rocky shoreline/substrate versus sand shoreline/substrate, and abundance of kelp” (Thompson 1996, as cited in FWS 1997). Key prey species include Pacific sand lance, Pacific herring, northern anchovy, smelt, and possibly sardines, although the birds will forage on a variety of other small fish and macrozooplankton.

In the project area, marbled murrelets occur throughout the year in the nearshore marine waters and bays, and must select areas which provide adequate prey resources within swimming distance for about two months during the flightless molting period (July to December)(Carter and Stein 1995). As indicated in a study by Thompson (1999), marbled murrelets are more abundant closer to shore. In Thompson's study (1996, as cited in FWS 1997), murrelet density declined with increasing distance from the coastline. Survey data collected under the auspices of the Northwest Forest Plan effectiveness monitoring indicate that murrelet densities in the project area begin to decline 1.9 miles from shore (Lynch 2006 pers. comm.) and Huff et al. (2006) reported that only a small proportion of the population (generally less than 5 percent) is found beyond 1.86 miles from shore. The density of marbled murrelets is known to be higher in the Strait of Juan de Fuca (Huff et al. 2006). Survey results also indicated that marbled murrelet density from 2000 to 2004 in the project area vicinity (specifically along the outer Washington Coast from Cape Flattery to Point Grenville) ranged from 0.4 birds per square mile (in 2000) to 0.9 birds per square mile (in 2004) (Lance and Pearson 2005).

Short-tailed Albatross

The short-tailed albatross, which is federally listed as endangered under ESA, is an extremely rare bird off Washington's coastline (65 FR 46643, July 31, 2001). According to the Seattle Audubon Society's BirdWeb, there were only a few valid records of the short-tailed albatross on the west coast south of Alaska between 1940 and 1990, with most seen between April and August (Seattle Audubon Society 2005). Since the early 1990s, sightings have increased, and a few birds are reported off the west coast annually. Sightings of these pelagic birds are generally more than 20 miles from the coastline. Short-tailed albatross feed primarily on squid (Seattle Audubon Society 2005).

Sea Turtles

Four species of sea turtles occur off Washington's outer coast: the leatherback turtle, green turtle, loggerhead turtle, and olive ridley turtle. Leatherback sea turtles are federally listed as endangered under ESA, while the three other sea turtles are federally listed as threatened in the Washington area (35 FR 8491, June 2, 1970; 43 FR 32800, July 28, 1978). Leatherback sea turtles are associated with pelagic habitats and occur with some regularity in the deep waters off the coast of Washington (Bowlby et al. 1994). In addition, these turtles occasionally have been sighted in bays and estuaries, although bays and estuaries are not their preferred habitat (Brown et al. 1995). Leatherback sea turtles' diet consists almost exclusively of jellyfish (Sea Turtle, Inc. 2005). The species does not nest in Washington State.

The other three sea turtle species (green, loggerhead, and olive ridley) are strictly warmer water species, and they occur infrequently off the coast of Washington during the summer (Brown et al. 1995). Higher occurrences of the sea turtles coincide with El Niño years that are characterized by warmer currents in the area. Diet of the three species varies. The green sea turtle is mostly herbivorous and feeds on a variety of sea grasses and marine algae; the loggerhead is primarily carnivorous and feeds on a variety of crabs, jellyfish, shellfish, and sponges; and the olive ridley is omnivorous and feeds primarily on crustaceans, mollusks, and tunicates (Sea Turtle, Inc. 2005). None of these sea turtles nests in Washington State.

3.5.3.2.2 Non-Listed Birds and Their Associated Habitats

The project area provides important habitat for bald eagles and some of the largest seabird colonies in the continental United States. The area also provides wintering and other non-breeding habitat for marine birds. Considering all seasonal uses, more than 100 marine bird species use the marine waters, associated beaches, and offshore islands within the project area, with 20 of these species known to nest in the project area (Table 3-12).

The bald eagle was removed from the ESA list of threatened species on July 9, 2007 (72 FR 37346). These birds are present in Washington State year-round, although individual birds may be present for only a portion of the year (e.g., the wintering period). Bald eagles nest in large, superdominant trees, generally away from intense human activity, and they forage in nearby waters with abundant fish, waterfowl, and seabird prey (Stinson et al. 2001). Perch sites generally consist of large trees along shorelines. Roost sites are typically large trees within forested stands that are located within 0.67 mile of foraging areas (Stinson et al. 2001).

Bald eagle nest sites occur throughout the proposed action area coastline. Most of the Washington State bald eagle wintering population occurs along major salmon rivers (e.g., Skagit, Nooksack, and Columbia Rivers), but the birds also winter along the state's outer coastline and along the Strait of Juan de Fuca, including portions of the project area (Stinson et al. 2001).

The marine environments used by marine birds in the project area can be divided into six habitat types: (1) coastal beaches, bays, and estuaries; (2) coastal headlands and islands; (3) nearshore marine waters; (4) inland marine deeper waters; (5) marine shelf; and (6) oceanic waters. Habitat types for marine birds are based on Buchanan et al. (2001), but were modified slightly for consistency with marine fish habitat types (NMFS 2005a) and marine mammal habitats. This section describes these habitats and their associated bird species.

1 **TABLE 3-12. MARINE BIRD SPECIES PRESENT IN THE MAKAH U&A**

Common Name	*Scientific Name*
LOONS AND GREBES	***GAVIIDAE AND PODICIPEDIDAE***
Common loon	*Gavia immer*
Pacific loon	*Gavia pacifica*
Red-throated loon	*Gavia stellata*
Yellow-billed loon	*Gavia adamsii*
Horned grebe	*Podiceps auritus*
Red-necked grebe	*Podiceps grisegena*
Western grebe	*Aechmophorus occidentalis*
Eared grebe	*Podiceps nigricollis*
TUBENOSES	***PROCELLARIIFORMES (DIOMEDEIDAE, PROCELLARIIDAE AND HYDROBATIDAE)***
Black-footed albatross	*Diomedea nigripes*
Short-tailed albatross	*Phoebastria albatrus*
Laysan albatross	*Diomedea immutabilis*
Buller's shearwater	*Puffinus bulleri*
Flesh-footed shearwater	*Puffinus carneipes*
Pink-footed shearwater	*Puffinus creatopus*
Short-tailed shearwater	*Puffinus tenuirostris*
Sooty shearwater	*Puffinus griseus*
Northern fulmar	*Fulmaris glacialis*
Fork-tailed storm petrel*	*Oceanodroma furcata*
Leach's storm petrel*	*Oceanodroma leuchorhoa*
PELICANS AND CORMORANTS	***PELECANIDAE AND PHALOCROCORACIDAE***
Brown pelican	*Pelecanus occidentalis*
Brandt's cormorant*	*Phalacrocorax penicillatus*
Double-crested cormorant*	*Phalacrocorax auritis*
Pelagic cormorant*	*Phalacrocorax pelagicus*
SWANS, GEESE, AND DUCKS	***ANATIDAE***
Trumpeter swan	*Cygnus buccinator*
Tundra swan	*Cygnus columbianus*

Common Name	*Scientific Name*
Aleutian Canada goose	*Branta canadensis leucopareia*
Brant	*Branta bernicla*
Black scoter	*Melanitta nigra*
Surf scoter	*Melanitta perspicillata*
White-winged scoter	*Melanitta fusca*
Harlequin duck	*Histrionicus histrionicus*
Oldsquaw	*Clangula hyemalis*
Bufflehead	*Bucephala albeola*
Common goldeneye	*Bucephala clangula*
Barrow's goldeneye	*Bucephala islandica*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Canvasback	*Aythya valisineria*
Red-breasted merganser	*Mergus serrator*
Common merganser	*Mergus merganser*
Hooded merganser	*Lophodytes cucullatus*
Gadwall	*Anas strepera*
Eurasian widgeon	*Anas penelope*
American widgeon	*Anas americana*
Mallard	*Anas platyrhynchos*
Green-winged teal	*Anas crecca*
Blue-winged teal	*Anas discors*
Northern shoveler	*Anas clypeata*
Northern pintail	*Anas acuta*
Ruddy duck	*Oxyura jamaicensis*
RAILS, GALLINULES, AND COOTS	***RALLIDAE***
American coot	*Fulica americana*
EAGLES, OSPREYS AND FALCONS	***FALCONIFORMES***
Bald eagle*	*Haliaeetus leucocephalus*
Osprey*	*Pandion haliaetus*
Peregrine falcon*	*Falco peregrinus*

Common Name	*Scientific Name*
OYSTERCATCHERS	***HAEMATOPODIDAE***
Black oystercatcher*	*Haematopus bachmani*
PLOVERS	***CHARADRIIDAE***
Killdeer*	*Charadrius vociferous*
Semipalmated plover	*Charadruis semipalmatus*
American golden plover	*Pluvialis dominicus*
Black-bellied plover	*Pluvialis squatarola*
SANDPIPERS, TURNSTONES, SURFBIRDS, AND PHALAROPES	***SCOLAPACIDAE***
Black turnstone	*Arenaria melanocephala*
Ruddy turnstone	*Arenaria interpres*
Surfbird	*Aphriza virgata*
Marbled godwit	*Limosa fedoa*
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Spotted sandpiper*	*Actitis macularia*
Whimbrel	*Numenius phaeopus*
Wandering tattler	*Heteroscelus incanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Short-billed dowitcher	*Limnodromus griseus*
Rock sandpiper	*Calidris ptilocnemis*
Baird's sandpiper	*Calidris bairdii*
Dunlin	*Calidris alpina*
Least sandpiper	*Calidris minutilla*
Sanderling	*Calidris alba*
Western sandpiper	*Calidris mauri*
Red phalarope	*Phalaropus fulicaria*
Red-necked phalarope	*Phalaropus lobatus*
Northern phalarope	*Lobipes lobatus*
JAEGERS AND SKUAS	***STERCORARIINAE***
Long-tailed jaeger	*Stercorarius longicaudus*

Common Name	*Scientific Name*
Parasitic jaeger	*Stercorarius parasiticus*
Pomarine jaeger	*Stercorarius pomarinus*
South polar skua	*Catharacta mccormicki*
GULLS AND TERNS	***LARIDAE***
Bonaparte's gull	*Larus philadelphia*
California gull	*Larus californicus*
Glaucous-winged gull*	*Larus glaucescens*
Heerman's gull	*Larus heermanni*
Herring gull	*Larus argentatus*
Mew gull	*Larus brachyrhynchos*
Ring-billed gull	*Larus delawarensis*
Sabine's gull	*Xema sabini*
Thayer's gull	*Larus thayeri*
Western gull*	*Larus occidentalis*
Black-legged kittiwake	*Rissa tridactyla*
Caspian tern	*Sterna caspia*
Common tern	*Sterna hirundo*
Forster's tern	*Sterna forsteri*
Arctic tern	*Sterna paradisaea*
ALCIDS	***ALCIDAE***
Ancient murrelet	*Synthliboramphus antiquum*
Cassin's auklet*	*Ptychoramphus aleutica*
Common murre*	*Uria aalge*
Marbled murrelet	*Brachyramphus marmoratus*
Pigeon guillemot*	*Cepphus columbia*
Rhinoceros auklet*	*Cerorhinca monocerata*
Tufted puffin*	*Lunda cirrhata*
KINGFISHERS AND HERONS	***ALCEDINIDAE AND ARDEIDAE***
Belted kingfisher*	*Ceryle alcyon*
Great blue heron*	*Ardea herodias*
Green heron	*Butorides striatus*

Common Name	*Scientific Name*
American bittern	*Botaurus lentiginosus*

Sources: Speich and Wahl 1989; Peterson 1990; Buchanan et al. 2001; FWS 2005c.

* = species known to nest in the area.

Coastal Beaches, Bays, and Estuaries

The project area includes several beaches, bays, and estuaries (Figure 3-2). Bays and estuaries provide concentrations of nutrients and forage for marine birds and shorebirds such as loons, grebes, mergansers, scoters, dunlins, plovers, and sandpipers. Beaches, particularly those with fine-grained sand, provide forage areas for several shorebird species, including sanderlings, dunlins, and killdeer. Human-made structures, such as jetties, pilings, and buoys, provide important roosting habitat for cormorants, gulls, and other birds. Approximately 49 marine bird species in Washington State are closely associated with beaches, bays, and estuaries; 37 marine bird species are generally associated; and another 16 marine bird species occasionally use beaches, bays, and estuaries (Table 3-13). Bird densities along the beaches and in the bays and estuaries are particularly high during spring and fall migration during winter.

TABLE 3-13. MARINE BIRD SPECIES RICHNESS IN MARINE HABITATS BASED ON HABITAT ASSOCIATION

	HABITAT USE (RECORDED AS NUMBER OF SPECIES)			
HABITAT TYPE	CLOSELY ASSOCIATED[1]	GENERALLY ASSOCIATED[2]	OCCASIONAL USE[3]	TOTAL
Beaches, bays, and estuaries	49	37	16	102
Headlands and islands	22	14	2	38
Nearshore marine	31	26	10	67
Inland marine	21	17	9	47
Marine shelf	28	15	9	52
Oceanic	18	7	3	28

[1] Closely associated: A species is widely known to depend on a habitat for part or all of its life-history requirements.

[2] Generally associated: A species exhibits a high degree of adaptability and may be supported by a number of habitats. These habitats play a supportive role for the species' maintenance and viability.

[3] Occasional use: A species demonstrates occasional use of a habitat. The habitat provides marginal support to the species for its maintenance and viability.

Source: Table adapted and modified from Buchanan et al. (2001). Because some species are associated with more than one habitat type, totals within columns are not additive.

Coastal Headlands and Islands

This habitat type includes coastal headlands and bluffs, rocky cliffs, and offshore rocks and islands. In the project area, steep headlands, bluffs, and cliffs are used by ledge-nesting birds, including peregrine falcons, pelagic cormorants, and common murres. Offshore islands and rocks support large breeding colonies of seabirds (Speich and Wahl 1989; Buchanan et al. 2001; FWS 2005c).

Comprehensive information on seabird colony breeding densities in Washington is available from Speich and Wahl (1989). These researchers summarized seabird colony data from surveys conducted from 1978 to 1982. In the Cape Flattery survey region, which extends along the outer Washington coast from Cape Flattery to Carroll Island and inland along the Strait of Juan de Fuca to Sail Rock, surveyors documented 13 breeding seabird species, the most common of which were Cassin's auklets, Leach's storm-petrels, and tufted puffins (Table 3-14). Sites with the highest recorded abundance of seabird colonies (all species combined) in this region include Carroll Island (18,876 breeding seabirds), Bodelteh Island (11,618 breeding seabirds), and the Tatoosh Islands (3,528 breeding seabirds). In addition to the survey sites from the Cape Flattery survey region, the Speich and Wahl report includes data from Jagged Island, near the southern boundary of the Makah U&A. The surveyors recorded 37,057 breeding seabirds on Jagged Island, including 20,000 Leach's storm-petrels, 7,800 tufted puffins, and 8,000 Cassin's auklets (Speich and Wahl 1989).

TABLE 3-14. BREEDING SEABIRD SPECIES AND ABUNDANCE IN THE VICINITY OF CAPE FLATTERY

SPECIES	APPROXIMATE NUMBER OF BREEDING BIRDS
Cassin's auklet	24,000
Leach's storm-petrel	11,000
Tufted puffin	8,700
Glaucous-winged or western gulls	4,400
Fork-tailed storm-petrel	3,700
Common murre	900
Pelagic cormorant	900
Rhinoceros auklet	200
Double-crested cormorant	150
Pigeon guillemot	150
American black oystercatcher	60
Brandt's cormorant	10

Source: Speich and Wahl (1989)

A variety of shorebirds (such as plovers, oystercatchers, sanderlings, and sandpipers) uses offshore rocks and islands and their associated tidal areas for foraging and roosting. The larger islands (including Ozette Island and the Bodelteh Islands) are used by several raptors (such as peregrine falcons) for foraging and occasionally nesting. Passerines (such as swallows and sparrows) use these islands for nesting, foraging, and migration resting areas (FWS 1985). Nesting great blue herons have also been documented on the larger islands (FWS 1985). The island vicinities are also used by migrating and wintering marine birds (such as gulls, loons, grebes, and scoters). Buchanan et al. (2001) indicate that 22 marine bird species in Washington are closely associated with headlands and offshore islands (Table 3-13).

Nearshore Marine Zone

The nearshore marine habitat zone includes those marine waters along shorelines that are not significantly affected by freshwater inputs (i.e., excludes bays and estuaries) (Buchanan et al. 2001). Nearshore marine habitat includes both nearshore marine waters and inland marine deeper waters. Nearshore marine waters extend from the high tide line to a depth of approximately 66 feet (Buchanan et al. 2001). Typical birds that forage in nearshore marine waters include common murres, sooty shearwaters, western grebes, Brandt's cormorants, and rhinoceros auklets. Species richness and bird densities are greatest in winter, although common murres, rhinoceros auklets, and sooty shearwaters may concentrate in large numbers during the summer (Buchanan et al. 2001). A variety of common marine birds (e.g., phalaropes, other shorebirds, and waterfowl) also uses nearshore marine habitats as migration corridors (Buchanan et al. 2001). Buchanan et al. (2001) indicate that 31 bird species in Washington are closely associated with nearshore marine waters (Table 3-13).

Within the project area, inland marine deeper waters include waters ranging from 66 feet deep within the western portion of the Strait of Juan de Fuca up to 120 feet deep. Species richness is relatively low in this area, with richness and bird densities higher in winter than summer (Table 3-13) (Buchanan et al. 2001). Common wintering birds in the area include western grebes, common murres, scoters, phalaropes, mergansers, buffleheads, and goldeneyes (Buchanan et al. 2001; Nysewander et al. 2004). Murres are also common in summer, along with cormorants and auklets.

Continental Shelf

Along the outer coast of Washington, the continental shelf habitat includes those marine waters from approximately 120 to 600 feet deep (Buchanan et al. 2001; as modified by NMFS 2005a). As with the nearshore marine habitat, the continental shelf provides foraging habitat and a migration route for a variety of marine birds. In Washington, 28 birds are highly associated with continental shelf habitat (Table 3-13). Typical birds that forage in the shallower portions of the continental shelf are common murres, rhinoceros auklets, tufted puffins, and sooty shearwaters. Typical birds in the outer, deeper portions of the continental shelf include albatrosses, fulmars, storm-petrels, and shearwaters (in addition to the sooty shearwater). Species use varies by season, with the most species during winter and the fewest species during summer (Buchanan et al. 2001). Bird densities are greatest in summer and early fall, when both summer residents and migrant phalaropes, jaegers, terns, and alcids are present (Buchanan et al. 2001).

Continental Slope

Oceanic waters include the marine slope (waters from 600 to 4,200 feet deep) and offshore areas (waters greater than 1.25 miles deep) (Buchanan et al. 2001; as modified by NMFS 2005a). Species richness and bird densities in oceanic waters are diminished compared to the other marine habitats, presumably due to the lower abundance of food in oceanic waters (Table 3-13; Buchanan et al. 2001). As with the continental shelf, bird densities in oceanic waters are greatest in late summer to early fall, when both summer residents and fall migrants are present. Characteristic bird species of the continental shelf include the black-footed albatross, fork-tailed storm-petrel, northern fulmar, herring gull, and black-legged kittiwake.

3.5.3.3 Sensitivity of Wildlife to Noise and Other Disturbance

This section describes the sensitivity of marine wildlife species to noise and other disturbance. Anthropogenic noise can be either transient or continuous and can result in a variety of effects with consequences ranging from none to severe (Würsig and Richardson 2002). Examples of transient noise include helicopters, planes, and explosions; examples of continuous noise include ships underway and dredging activities. The discussion that follows focuses on wildlife sensitivity to noise potentially generated from activities associated with a Makah whale hunt, including aircraft overflights, boat traffic, and use of gunfire or explosives. See Section 3.11, Noise, for a discussion of key concepts related to noise, as well as existing noise levels in the project area.

Marine mammals may respond to noise and other disturbance in many ways, including changes in behavior, avoidance reactions, masking, hearing impairment, and nonauditory physiological effects and stress (Würsiig and Richardson 2002). For marine mammals that rely on sound for communication, finding prey, avoiding predators, and probably navigation, perturbations involving noise could have negative impacts on fitness or survival.

Effects of disturbance on marine birds can range from temporary minor behavioral changes, such as indicating an alert response, to nest abandonment. Bird responses depend on a variety of factors as described further in the sections below (Carney and Sydeman 1999; PRBO 2005). Colonial nesting birds are particularly vulnerable to disturbance due to their high nesting densities and group behavior; when one bird responds to a given disturbance (e.g., flushing from its nest), other birds often follow (Rodgers and Smith 1995).

3.5.3.3.1 Aircraft Overflights

Based on a review of studies of response of species found in west coast National Marine Sanctuaries, Moore (1997) concluded that aircraft overflights "can and do disturb wildlife." Disturbance varies by species and the specifics of the situation, however. Reactions among some bird species may range from increased vigilance and attentiveness (including scanning by head-turning) to flushing from a nest or perch (Brown 1990; Stalmaster and Kaiser 1997; Giese and Riddle 1999; Ward et al. 1999). In similar circumstances, other species may not react at all (Parrish et al. 2005). In their review of overflight and wildlife disturbance, the National Park Service (1995) indicated mixed results, with some species exhibiting response to overflights, but other species showing minimal or no response. At least one study (peregrine falcons) indicated no apparent change in parental behavior from low (less than 500 feet) military overflights, while another study (waterfowl) found minimal disturbance caused by military overflights (Parrish et al. 2005). With increasing numbers of overflights, some wildlife may habituate to aircraft noise (e.g., black ducks), whereas other species do not (e.g. wood ducks, black brant, emperor, and Canada geese) (Conomy et al. 1998; Ward and Stein 1989).

In general, conclusions based on responses of one species are not necessarily applicable to another species (Manci et al. 1988); similarly, responses to one aircraft type may differ from responses to other types, even within a single species (National Park Service 1995; Ward et al. 1999). In a field study using playback of recordings of overflights to measure effects on seabirds, Brown (1990) found that the level of response increases with increasing noise. This is notable because not all aircraft produce the same amount of noise; thus, a quieter closer aircraft may cause less disturbance than a noisier aircraft farther away (Parrish et al. 2005). In a study of nesting osprey, Trimper et al. (1998) found that adult osprey did not appear to be disturbed by military overflights at various distances, approximately 2 miles from the nest, but reacted strongly to float planes approaching within 4.8 miles. Parrish et al. (2005) noted that helicopters typically cause more disturbance than other aircraft types.

Based on observations of marine birds and aircraft overflights at Tatoosh Island, Parrish et al. (2005) drew the following general conclusions:

1. Aircraft type has a substantial effect on disturbance level, independent of altitude, with louder aircraft having a greater effect.

2. Immediate geomorphology has an effect on disturbance level, as concave surfaces (bowls) concentrate sound whereas convex surfaces dispel sound.
3. The timing of the disturbance event within the breeding season has an effect on disturbance level; earlier in the season (before egg laying), birds are more likely to exhibit signs of disturbance (culminating in temporary evacuation of nesting or loafing sites), whereas later in the season (when pairs have eggs or chicks), birds may remain on nests even during elevated levels of disturbance.
4. Not all species respond equally. Disturbance varies by species and the specifics of the situation such that even related species differ in their responses. Disturbance may also not occur or be minimal. The lateral distance of the aircraft also strongly affects whether wildlife are disturbed. The correlation between distance and increased disturbance may result from increasing noise levels. The sudden appearance of aircraft, especially in the case of infrequent overflights, may also disturb wildlife.
5. Based on observed disturbance caused by overflights, several authors conclude that aircraft altitude restrictions should be developed or maintained, with recommendations for the distance aircraft should stay from wildlife ranging from 500 to 5,000 feet, depending on the species under consideration (Giese and Riddle 1999; Grubb and Bowerman 1997; Stalmaster and Kaiser 1997).
6. For any particular aircraft type, flying at lower altitudes generally increases the level of disturbance.

Few studies have documented the response of marine mammals to overflights (Parrish et al. 2005). Studies measuring the response of marine animals to noise were summarized by Myrberg (1990), who noted numerous reports of marine mammal disturbance caused by man-made sources, including offshore oil drilling and shipping. In a study of bowhead and beluga whales, Patenaude et al. (2002) found that helicopters cause more disturbance than other types of aircraft. Insley (1993) used sound recordings, sound pressure measurements, and video recordings to study the effect of aircraft overflights on northern fur seal behavior at St. George Island, Alaska. He found that if pilots followed the prescribed flight path and altitude and did not pass over the seal rookeries there was no discernable impact on the seals.

Response to aircraft may also depend on overflight frequency. With increasing numbers of overflights, some wildlife may habituate to aircraft noise, whereas other species will not

(Conomy et al. 1998). Conversely, sensitization may also occur. For example, the response of harbor seals increased with greater overflight occurrence (Johnson 1977 in Moore 1997).

Some specific study results relevant to the Makah proposal are as follows:

1. In a review paper of marbled murrelets, Nelson (1997) stated that aircraft flying at low altitudes are known to cause marbled murrelets to dive, although the specific altitude was not mentioned.

2. Pilots are asked to stay more than 2,000 feet above ground level when flying over the OCNMS and to follow Federal Aviation Administration guidelines as indicated on navigational charts. These charts advise pilots that overflights below this altitude may disturb wildlife, resulting in a violation of federal law (Parrish et al. 2005).

3. Several studies have documented effects of aircraft on foraging and nesting eagles. In a study of nesting eagles in Michigan, average eagle flushing distance was approximately 0.5 mile for jets, 0.75 mile for light planes, and 0.4 mile for helicopters (Grubb et al. 1992). In a study on the effects of helicopters on nesting eagles in northwestern Washington, Watson (1993) reported that 53 percent of nesting eagles were disturbed (i.e., alert and flush behavior) when helicopters approached within 1,500 feet of eagle nests. In a study of wintering bald eagle response to military activities at Fort Lewis, Washington, investigators reported that most eagles flushed when helicopters approached within 1,000 feet (Stalmaster and Kaiser 1997). In their Draft National Bald Eagle Management Guidelines (2006), FWS recommends that aircraft maintain a distance of at least 1,000 feet from eagle nests during the nesting season, except where eagles have demonstrated tolerance for such activity.

4. In a study of the effects of low-level jet aircraft overflights along the Naskaupi River, Labrador, Canada, nesting osprey behavior did not differ significantly between pre- and post-overflight periods, and adult osprey did not appear agitated or startled when overflown by jet aircraft (at overflights as low as 100 feet aboveground) (Trimper et al 1998). Osprey were attentive to and occasionally flushed from nests when float planes entered their territories.

5. At a mixed cliff-nesting colony of fulmars, shags, herring gulls, kittiwakes, guillemots, razorbills, and puffins on the Aberdeenshire coast of Scotland, aircraft flying at heights

about 300 feet above the cliff-top did not affect the attendance of incubating and brooding birds (Dunnet 1977).

3.5.3.3.2 Boat Traffic

A study on the Pribilof Islands in summer 1990 measured the effect of direct noise (airplanes, land vehicles, ships, and construction activities) on northern fur seal behavior at rookeries on St. Paul Island (Insley 1992). Noise levels were measured on land near the rookeries as ships moved toward and away from the island during all hours of the day. Ship noise at the rookeries averaged approximately 82 dB in a frequency range between 60 and 300 hertz (Hz). No effect from ship noise was observed in fur seal behavior during this study. In contrast, Insley et al. (2003) found that fur seals foraging at sea changed their direction of movement when commercial trawl vessels were nearby. As summarized by Würsig and Richardson (2002) the strongest components of sound from many of the major anthropogenic sources are below 1,000 Hz; the sounds from outboard motors operating at high speed ranges.

Marine birds can also be sensitive to disturbance from boat traffic. Bird responses to boat traffic range from changing body position to abandoning a foraging attempt to flushing from a nest (Burger 1998; Carey and Sydeman 1999; PRBO 2005). Responses of birds depend on a variety of factors, including the time of year; type, speed, and distance of boats from the birds; frequency of disturbance; bird species; and bird activity (foraging, roosting, or nesting) (Burger 1998; Ronconi and St. Clair 2002; Rodgers and Schwikert 2002). In general, mobile birds (e.g., foraging birds) move away from areas with high boat traffic, while nesting birds show behavioral, growth, or reproductive effects, with varying degrees of habituation (Kuletz 1996; Burger 1998).

Some specific study results relevant to the Makah proposal are as follows:

1. Of the hundreds of murrelets that researchers encountered with their skiff each day in Alaska's Auke Bay and Fritz Cove, most of the birds reacted to the skiff by paddling away; only a few of the birds reacted by flying away (Speckman et al. 2004). However, on eight separate occasions, murrelets that were holding fish crosswise in their bills swallowed the fish on approach of the skiff, generally when the skiff was within 15 to 130 feet of the bird. The birds holding fish were presumed to be parents about to make food deliveries to their chicks (as consistent with other alcids). Consequently, skiff disturbance represented a loss in food for the chicks. The researchers concluded that such disturbance could be detrimental to murrelets in areas where prey are relatively scarce,

where birds' inland nests are far from marine foraging areas, or where boat traffic is concentrated in waters immediately adjacent to nesting areas.

2. Observers conducting boat surveys for marbled murrelets noted that the birds dove more often than flew when a boat approached. If approached slowly and from an angle, however, the birds paddled away from the boat Neatherlin, WDFW, personal communication. 2003, as cited in FWS 2003).

3. In a study in Finland, boat disturbance (at levels of 3.5 to 8.5 disturbances per day) lengthened the swimming distances of velvet scoter ducklings and reduced the time used for feeding (Mikola et al. 1994). The birds showed a response to the boats when the boats were within 100 feet of the ducks. Birds disturbed more frequently than average were smaller than birds disturbed less frequently. The frequency of predatory gull attack on the ducks was 3.5 times higher in disturbed areas than undisturbed areas.

4. In a study in Florida, researchers investigated the flushing distance of 23 waterbird species to personal watercraft and outboard-powered boats (Rodgers and Schwikert 2002). Flushing distance for foraging and loafing birds varied by species and individual and boat type. Average flush distance by species ranged from 77 feet (Forster's tern) to 190 feet (osprey) of outboard-powered boats and 64 feet (least tern) to 162 feet (osprey) for personal watercraft. Based on their study results, the researchers suggested buffer zones of 590 feet for wading birds, 490 feet for osprey, 460 feet for terns and gulls, and 330 feet for plovers and sandpipers to minimize disturbance at foraging and loafing sites.

5. Several studies have documented effects of boats on foraging and nesting eagles. In a study of nesting eagles in Michigan, average eagle flushing distance was 360 feet for power boats and about 1,000 feet for canoes/kayaks (Grubb et al. 1992). Foraging eagles on the Columbia River maintained an average distance of 1,300 feet from stationary boats. In the presence of boats, the birds reduced their feeding time and number of foraging attempts (McGarigal et al. 1991). In a study of wintering bald eagle response to military activities at Fort Lewis, Washington, investigators reported that most eagles flushed when boats approached within 330 feet (Stalmaster and Kaiser 1997). In a study of wintering eagles along the Nooksack and Skagit Rivers in Washington, researchers reported that average distance for perched eagles flushed by a canoe was approximately 500 to 550 feet, and average flush distance for eagles standing or feeding on the ground was approximately 750 to 900 feet, although more sensitive eagles flushed at distances

out to approximately 1,150 feet (Knight 1984). In their Draft National Bald Eagle Management Guidelines (2006), FWS recommends that within 300 feet of eagle nests during the nesting season (1) concentrations of noisy vessels (e.g., commercial fishing boats and tour boats) should be avoided, except where eagles have demonstrated tolerance for such activity; and (2) other motorized boat traffic should attempt to minimize trips and avoid stopping in the areas where feasible, particularly where eagles are unaccustomed to boat traffic.

Marine birds may be sensitive to underwater noise when they are diving to catch fish. Effects can range from behavioral changes (e.g., delayed or aborted foraging attempts, avoidance of potential foraging areas) to physical injury (FWS 2003). Based on a review of studies of the effects of noise on animals in underwater environments, FWS (2003) estimated that peak sound pressure levels greater than 180 dB have the potential to cause physical injury. A recent study of noise levels from small powerboats found peak levels of 145 to 150 dB, primarily in the 350- to 1,200 Hz frequency range (Bartlett and Wilson 2002). Similarly, Hildebrand (2005) reported peak noise levels of 140 dB for small fishing vessels. Higher noise levels are associated with larger vessels; Richardson et al. (1995) provided estimates of 171 dB for a tug and barge and 181 dB for a large supply ship.

3.5.3.3.3 Gunfire and Explosives

Studies on the effects of non-lethal gunfire on marine birds are rare. Investigators did study the effect of military shooting ranges on the birds of the Wadden Sea, although effects may have been confounded by aircraft effects (Kuesters and Van Raden 1998). The investigators stated that the reactions of the birds to bombing and shooting air-to-ground missiles and machine guns from low-flying planes varied from continuing feeding to alert behavior to spontaneous flight. Reaction intensity depended on the sequence in which the weapons were fired (i.e., birds were more likely to become habituated if the shooting started with low-noise weapons) and particularly on the tide, with higher tides (and associated concentrations of birds on their high-tide roosts) eliciting stronger responses. In a study of wintering bald eagle response to military activities at Fort Lewis, Washington, investigators reported that most eagles were not "overly disturbed" by artillery and small arms fire (Stalmaster and Kaiser 1997). In a study of nesting eagles in Michigan, average eagle flushing distance was approximately 1,600 feet for gunfire and 5,000 feet for artillery fire (Grubb et al. 1992).

Indirect evidence of the effects of gunfire on birds can be obtained from results of bird hazing activities at aquaculture facilities, hydroelectric facilities, agricultural sites, and oil spills. In general, gunfire and other pyrotechnics initially cause foraging birds to flush, but the birds usually become habituated to the gunfire over time (Bomford and O'Brien 1990; Salmon and Marsh 1991; Bechard and Marquez-Reyes 2003). The intermittent use of weapons during a Makah whale hunt would not be expected to result in birds habituating to the gunfire.

3.5.3.3.4 Marine Mammals and Underwater Noise

Within animals, hearing characteristics vary among individuals, sex and age classes, populations, and species. Hearing capabilities of marine mammals have been studied for just over 20 of approximately 125 species (Richardson et al. 1995; Wartzok and Ketten 1999; Würsig and Richardson 2002). The species studied are limited to those small enough to be held in captivity. Traditionally, direct hearing measurements have involved trained responses; more recently, electrophysiological methods have been used to measure neural activity in animals presented with sound. For larger or rare species, hearing must be estimated from mathematical models based on anatomy, inferred from the sounds they produce, or from reactions to sounds in their environment.

Of the cetaceans, baleen whales are thought to be most sensitive to low-frequency sounds (approximately 10 to 5,000 Hz) based on characteristics of their auditory morphology, behavioral responses, and sound production (Wartzok and Ketten 1999). See Section 3.4.3.6.5, Known and Potential Anthropogenic Impacts, Offshore Activities and Underwater Noise, for more information about gray whales and marine noise. No direct empirical data exist on the hearing of baleen whales. Most odontocetes (toothed cetaceans, such as killer whales, other dolphins and porpoises, and sperm whales) have functional hearing across a broader range of mid to high frequencies (from 200 to 100,000 Hz) (Johnson 1967; Hall and Johnson 1972; Erbe and Farmer 1998; Tremel et al. 1998; Szymanski et al. 1999). A few odontocetes, including harbor porpoises and river dolphins, hear relatively similarly in this broad range, but appear to be specialized for hearing sounds at very high frequencies (approximately 4,000 to 150,000 Hz or higher) (Wartzok and Ketten 1999).

Pinnipeds (seals, sea lions, and walrus) are fundamentally different from other marine mammals, because they are amphibious mammals performing important life functions both above and below water. Consequently, they have a number of auditory adaptations enabling fairly sensitive hearing across wide frequency ranges both in air and water (Richardson et al. 1995; Kastak and

Schusterman 1998). Pinnipeds can be segregated into two functional groups based on their underwater hearing capabilities: (1) otariids (sea lions and fur seals), which have been shown to be sensitive to a fairly wide range of mid frequencies (approximately 1,000 to 30,000 Hz); and (2) phocids (true seals) and walruses, which generally are capable of hearing across a wide range of low to mid frequencies (approximately 200 Hz to 50,000 Hz). The differences in hearing bandwidth in air are less striking between the phocids and otariids; in both taxa, functional bandwidth is narrower in air than in water.

Ketten (1998) reported that there are no conventional audiometric data available for sea otters, but research on river otters indicates a functional hearing range in air of approximately 450 to 35,000 Hz and a peak sensitivity of 16,000 Hz.

Noise and Marine Mammal Hearing

Noise exposure may result in a range of effects on auditory and non-auditory systems. Noise may be detectable, but have no effect on a mammal's hearing or physiology. The presence of noise may mask signals of interest (such as calls of other animals) (Bain and Dahlheim 1994; Erbe 2002; Southall et al. 2003). Intense or prolonged exposure may result in either temporary or permanent changes in hearing sensitivity (Malme et al. 1983; Malme et al. 1984; Malme et al. 1988; Ljungblad et al. 1988; Tyack and Clark 1998; Schlundt et al. 2000). Sound exposure may also induce physical trauma to non-auditory structures (Jepson et al. 2004; Fernandez et al. 2005), although much remains uncertain regarding the exact mechanisms. Because marine mammals in the project area rely on underwater sounds for various purposes, any strong anthropogenic sounds at relevant frequencies might have an effect.

Noise and Marine Mammal Behavior

Most studies of the effects of noise on marine mammal behavior are observational rather than experimental. Behavioral responses may take many forms, including subtle changes in surfacing and breathing patterns, cessation of vocalization, or active avoidance or escape from the vicinity of the noise source. Bowhead whales have been observed altering their diving and blowing behavior in response to human noises (Richardson et al. 1986). Many whale species have been seen to cease vocalizing in response to human noises. These include right whales (Watkins 1986), bowheads (Wartzok et al. 1989), sperm whales (Watkins and Schevill 1975; Bowles et al. 1994), and pilot whales (Bowles et al. 1994). Other responses include humpback whales lengthening their song cycles (Miller et al. 2000) and moving away from mid-frequency sonar (Maybaum 1993), beluga whales adjusting their echolocation clicks to higher frequencies (Au et al. 1985), and gray whales avoiding air gun noise (Malme et al. 1984). In contrast, some observers (e.g., Tyack and Clark 1998; Fristrup et al. 2003) have reported instances in which whales did not respond to human sounds. Responses may vary depending on age and sex. For example, cow-calf pairs of gray whales are considered more sensitive to disturbance by whale-watching vessels than other age or sex classes (Tilt 1985). Responses also appear to be affected by the location of the source relative to the animal, the motion of the source, and the onset and repetition of the sound (Hildebrand 2005).

In a study that used acoustic tags and controlled exposure experiments with north Atlantic right whales, Nowacek et al. (2004) examined the effects of shipping noise on marine mammal behavior. Five of six individual whales responded strongly (interrupted dive pattern and rapid ascent to the surface) to the presence of an artificial alarm stimulus (series of constant frequency and frequency modulated tones and sweeps), but ignored playbacks of vessel noise. More information about the effects of noise on gray whale behavior can be found in Section 3.4.3.6.5, Known and Potential Anthropogenic Impacts, Offshore Activities and Underwater Noise.

3.6 Economics

3.6.1 Introduction

This section describes current conditions and recent trends in economic activity within Clallam County and on the Makah Reservation, including Neah Bay. Information presented in this section includes the following:

- Countywide employment, personal income, and tourism statistics
- Commercial shipping information
- Makah tribal employment and personal income statistics
- Local economic conditions related to tourism
- County and tribal income generated by tourism
- Ocean sport and commercial fishing statistics
- Summary of economic effects of media coverage of the 1998, 1999, and 2000 Makah Tribe gray whale hunts

3.6.2 Regulatory Overview

No federal, state, or local regulations, statutes, or policies pertain specifically to the establishment or maintenance of the economic resources in the project area, other than those addressing wildlife management and hunting activities discussed in other sections of this chapter (Section 3.3.2, Regulatory Overview (Marine Habitat and Species), Section 3.4.2, Regulatory Overview (ENP Gray Whale, Section 3.5.2, Regulatory Overview (Other Wildlife Species).

3.6.3 Existing Conditions

3.6.3.1 Countywide Conditions (Clallam County)

3.6.3.1.1 Employment, Unemployment, and Labor Force

In addition to tourism and fishing, Clallam County's economic base is largely anchored by lumber and wood products, including the production of paper and related materials. Although the lumber and wood products industry has been adversely affected by several national recessions since the early 1970s, industries built around lumber, plywood, log exports, pulp and paper, and shakes and shingles continue to provide most of the goods-producing jobs in Clallam County. The Olympic Peninsula's climate and topography provide favorable growing conditions for forests, which produce more than 165 cubic feet of wood per acre per year. The markets for lumber and wood products, however, remain volatile. Invariably, factors such as interest rates, trading of the United States dollar, and government policies will continue to affect the industry. Protection of endangered species, specifically the spotted owl, also will continue to impact forestry activity (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2001).

Clallam County is becoming a retirement center of some note. In recent years, the number of retirees coming to the area has increased. A mild climate, particularly around the Sequim area, coupled with a relatively low cost of living, is attractive to retirees (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2001).

Since 2000, annual average wage and salary employment in Clallam County has increased by more than 15 percent, with employment growing by 3,160 jobs. Most of the job growth has occurred in service industries, where 1,040 jobs were added between 2000 and 2006. Employment growth also has been strong in the government sector, with 770 new jobs, and the retail trade sector, with 440 additional jobs (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2007a).

In 2006, an average of 23,780 wage and salary workers were employed in Clallam County. Goods-producing industries, including those involved in natural resources, mining, construction, and manufacturing, accounted for 16 percent of countywide employment, about the same as the 17 percent share of these industries' jobs statewide. Government employment generated nearly 28 percent of the county's jobs, compared to 18 percent statewide. Trade, service, transportation, warehousing, and utility industries accounted for the remaining wage and salary jobs, generating 56 percent of countywide employment opportunities, compared to 65 percent statewide (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2007a).

In addition to wage and salary employment, employment related to business ownership and self-employment is important to the economy of Clallam County. For example, in 2000, proprietors' employment produced nearly 9,500 jobs, in addition to contributing to countywide wages and salaries (Bureau of Economic Analysis 2005).

Clallam County's resident civilian labor force averaged 29,500 persons in 2006, reflecting labor force growth of 14 percent since 2000. This growth rate was substantially higher than the statewide labor force increase of 9 percent over the same period. Unemployment in the county in 2006 averaged 5.6 percent, higher than the statewide unemployment rate of 4.9 percent. Since 2000, growth in the employment of Clallam County's residents has outstripped growth of the county's resident labor force, resulting in an unemployment rate falling from 6.9 percent in 2000 to its current level. Over the same period, the statewide unemployment rate decreased slightly from 5.0 to 4.9 percent (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2007b).

3.6.3.1.2 Personal Income

Personal income is generally seen as a key indicator of a region's economic vitality. Personal income, as presented here, captures all forms of income: wages, salaries, government transfer payments, retirement income, farm income, self-employment income, proprietors' income, interest, dividends, and rent, but it does not include contributions toward social insurance. Social insurance payments are those made for certain government programs, including health, disability, unemployment, retirement, life insurance, and workers' compensation insurance programs. Nominal (not adjusted for inflation) total personal income for Clallam County increased from $995 million in 1990 to $1.9 billion in 2004, ranking the county fifteenth among Washington's 39 counties in total income in 2004 (Table 3-15). This 96 percent increase equates to an average 4.0 percent annual growth rate, very close to the state's 8.8 percent annual income growth over this period (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2007c).

Per capita income, which relates an area's total income to its population level, provides an indicator of the economic well-being of the residents of an area. In 2004, per capita income in Clallam County was $23,454, compared to $35,041 statewide, ranking the county thirteenth among the state's 39 counties (Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2001). Between 1999 and 2004, per capita income in Clallam County increased by nearly 63 percent, growing from $17,605 to $28,664 (Table 3-15).

TABLE 3-15. POPULATION AND PERSONAL INCOME IN CLALLAM COUNTY IN 1990 AND 2004

CATEGORY	1990	2004	PERCENT CHANGE 1990-2004 (%)
Population	56,525	67,991	20.3
Total personal income ($1,000s)	995,115	1,948,883	95.8
Per capita income ($1,000s)	17,605	28,664	62.8

Source: Bureau of Economic Analysis 2005. ; Washington State Employment Security Department, Labor Market and Economic Analysis Branch 2007c.

3.6.3.1.3 Tourism

Tourism is an important component of Clallam County's economy. The rugged, pristine environment and variety of habitats found along the Olympic Coast and the Strait of Juan de Fuca provide recreational opportunities for both residents and tourists. Additionally, Olympic National Park, which has attracted an average of 3.2 million recreation visitors per year since 1990 (National Park Service 2008), generates visitation to Clallam County, including its visitor centers in Port Angeles, Forks, Sequim, and Neah Bay (North Olympic Peninsula Visitor and Convention Bureau 2005a). Much of the land in Clallam County, including a large segment of its Pacific coastline, is within the Olympic National Park and Olympic National Forest. The OCNMS, which provides opportunities for wildlife viewing, also attracts visitors to the county's outer coastline. Additional information concerning Olympic National Park and the OCNMS is presented in Section 3.12.3.2, Vantage Points and Visual Opportunities in the Project Area.

According to a recent study of visitors to the Olympic Peninsula (Jim Lillstrom and Associates 2003), visitors to Clallam County participate in an array of sightseeing and recreation activities. General sightseeing, hiking, wildlife viewing, and visiting historical and cultural sites are among the most popular activities of visitors to the county (Table 3-16). In addition to hiking, other popular recreational activities include boating and water sports, biking, backpacking, rafting and kayaking, and fishing.

Tourism is a relatively large industry in Clallam County. According to a recent study of travel-related economic impacts, visitors spent $139.6 million at destinations in Clallam County in 2003 (Table 3-17), accounting for 1.5 percent of statewide travel spending. Spending occurs in several sectors of the county's economy, but is greatest in the food and beverages services sector (28 percent of total visitor spending) and accommodations sector (19 percent). Additionally, approximately 16 percent of visitor spending occurs in both the retail sales sector and the arts, entertainment, and recreation sector (Dean Runyan Associates 2004).

TABLE 3-16. PERCENTAGE OF VISITORS TO CLALLAM COUNTY PARTICIPATING IN SPECIFIC ACTIVITIES DURING THEIR VISITS

ACTIVITY	PERCENT OF DAY VISITORS (%)	PERCENT OF OVERNIGHT VISITORS (%)
Sightseeing/driving tour	53	75
Hiking	46	63
Wildlife viewing	36	58
Visiting historic/cultural site	35	56
Shopping	44	47
Visiting Native American site	21	43
Participating in a family event	26	20
Visiting a gallery	17	31
Boating/water sports	21	18
Biking	20	11
Backpacking	13	17
Attending a festival/event	16	14
Wine tasting	15	13
Rafting/kayaking	13	13
Fishing	16	10
Visiting a garden/farm	10	14
Antiquing	11	13
Golfing	10	5
Going to a casino	8	6

Source: Jim Lillstrom & Associates 2003.

TABLE 3-17. TRAVEL SPENDING IN CLALLAM COUNTY IN 2003

COMMODITY PURCHASED	TRAVEL SPENDING (MILLIONS $)	PERCENT OF TOTAL TRAVEL SPENDING (%)
Accommodations	26.2	18.8
Food and beverage services	39.7	28.4
Food stores	10.7	7.7
Ground transportation and motor fuel	16.9	12.1
Arts, entertainment, and recreation	22.8	16.3
Retail sales	23.2	16.6
Air transportation	0.1	0.1
TOTAL SPENDING	**139.6**	**100.0**

Note: Includes spending (in nominal dollars) at a destination in Clallam County related to all types of travel, including business and pleasure travel. Expenditures at a destination where a traveler stays overnight or at a destination more than 50 miles from a traveler's home are included.

Source: Dean Runyan Associates 2004.

Between 1991 and 2003, travel-related spending at destinations in Clallam County grew at an average annual rate of 3.6 percent, compared to 4.9 percent statewide (Table 3-18). Spending in the county increased in every year of the period except in 1994, when spending decreased by 1.9 percent, and in 1999, when spending decreased by 0.3 percent. The average annual growth rate of travel-related spending in Clallam County slowed after 1999, declining from an average of 4.1 percent between 1991 and 1998 to 3.6 percent between 1999 and 2003 (Table 3-18). The statewide growth rate of travel-related spending also slowed after 1999, with the statewide slowdown similar to the change in Clallam County (Table 3-18).

TABLE 3-18. TRAVEL SPENDING IN CLALLAM COUNTY AND WASHINGTON STATE, 1991 TO 2003

	CLALLAM COUNTY		WASHINGTON STATE	
YEAR	TRAVEL SPENDING (MILLIONS $)	CHANGE FROM PREVIOUS YEAR (%)	TRAVEL SPENDING (MILLIONS $)	CHANGE FROM PREVIOUS YEAR (%)
1991	97.8	NA	6,830.0	NA
1992	106.6	9.0	7,070.2	3.5
1993	107.3	0.7	7,306.4	3.3
1994	105.3	-1.9	7,490.0	2.5
1995	112.9	7.2	7,825.2	4.5
1996	114.2	1.2	8,323.7	6.4
1997	118.7	3.9	8,750.2	5.1
1998	126.0	6.1	9,063.0	3.6
1999	125.6	-0.3	9,599.0	5.9
2000	130.5	3.9	10,495	9.3
2001	135.2	3.6	10,472	-0.2
2002	135.8	0.4	10,356	-1.1
2003	140.1	3.2	10,845	4.7
Average annual percentage change 1991-1998	3.7	NA	4.1	NA
Average annual percentage change 1999-2003	2.8	NA	3.1	NA
Average annual percentage change 1991-2003	3.3	NA	4.3	NA

Note: Table includes spending (in nominal dollars) at a destination related to all types of travel, including business and pleasure travel. Expenditures at a destination where a traveler stays overnight or one more than 50 miles from a traveler's home are included. Unlike the 2003 spending shown in Table 3-17, spending in this table includes expenditures by county or state residents for air travel and travel agency services for trips to destinations outside of Clallam County or Washington State.

NA = not applicable.

Source: Dean Runyan Associates 2004.

Travel-related spending by visitors to Clallam County generates earnings and employment in visitor-serving industries. Earnings generated by travel spending totaled an estimated $41.8 million in 2003, including $25.2 million in the accommodations and food service sectors and $10.3 million in the arts, entertainment, and recreation sector (Table 3-19). Employment generated by travel-related spending in Clallam County totaled an estimated 2,920 jobs in 2003 (Table 3-19), accounting for 12.5 percent of Clallam County's wage and salary jobs and 8.7 percent of all jobs (including proprietors' employment) (Dean Runyan Associates 2004).

TABLE 3-19. ESTIMATED TRAVEL-RELATED ECONOMIC IMPACTS BY SECTOR IN CLALLAM COUNTY IN 2003

SECTOR	INDUSTRY EARNINGS GENERATED BY TRAVEL SPENDING (MILLIONS $)	JOBS GENERATED BY TRAVEL SPENDING
Accommodations and food service	25.2	1,540
Arts, entertainment, and recreation	10.3	1,080
Retail and gasoline	5.1	250
Auto rental and other ground transportation	0.9	40
Air transportation	0.1	Less than 5
Other travel	0.3	10
TOTAL	**41.8**	**2,920**

Source: Dean Runyan Associates 2004.

3.6.3.1.4 Commercial Shipping

Next to fishing, the predominant use of waters off the Olympic Coast is commodities transportation to and from port facilities in Puget Sound. In 2004 Puget Sound ports handled $63 billion worth of international trade (Washington Joint Transportation Committee 2007). Included in the commercial shipping traffic are tug boats with barges carrying hydrocarbon products along the coast. The entrance to the Strait of Juan de Fuca is highly congested by oil tankers, freighters, tugs and barges, and fishing vessels (NOAA 1993). Management of commercial vessel traffic near the project area and marine vessel traffic regulations adopted during the Makah Tribe's previous whale hunt are discussed in Section 3.13, Transportation. Similarly, data on transits into Washington State waters through the Strait of Juan de Fuca by large cargo and passenger vessels, tank ships, barges, and commercial fishing vessels are presented and discussed in Section 3.13, Transportation.

Commercial shipping routes in the Strait of Juan de Fuca and nearby waters, including Haro Strait, Boundary Pass, Rosario Strait, and the Strait of Georgia, are managed jointly by the United States and Canadian Coast Guards, primarily through the Cooperative Traffic System. This system allows for management of vessel traffic in a waterway segment without regard to the international boundary that separates the waters of the United States and Canada. A vessel separation scheme, similar to a divider median on a highway, is used to maintain a safe distance between opposing vessel traffic (United States Coast Guard 2002).

The Strait of Juan de Fuca traffic separation scheme encompasses five sets of traffic lanes, including the western and southwestern approaches to and from the Pacific Ocean, the western lanes in the Strait, the southern lanes to Port Angeles, and the northern lanes to Victoria. Each set of lanes consists of inbound and outbound traffic lanes with separation zones (NOAA 2005). The traffic lanes encompassed by the Strait of Juan de Fuca traffic separation scheme generally run through the center of the Strait of Juan de Fuca, near the boundary line separating the waters of the United States and Canada. The southern boundary of the traffic separation scheme generally lies about 4 nautical-miles offshore of Clallam County along the Strait of Juan de Fuca and extends further away from the coast as it leaves the Strait of Juan de Fuca and enters ocean waters. The Makah Tribe's U&A (Figure 3-1) overlaps the traffic separation scheme near the international boundary line in the Strait and encompasses the commercial traffic lanes that provide a southwestern approach to and from the Pacific Ocean near the mouth of the Strait.

Commercial traffic largely honors the OCNMS area to be avoided (Figure 3-1), discussed in more detail in Section 3.1.1.1.3, Current Issues (OCNMS), and Section 3.13, Transportation. The Coast Guard RNA, which was established to enforce vessel activities near any Makah whale hunt, falls within the area to be avoided, except for the portion of the RNA that wraps around Cape Flattery and Tatoosh Island (Figure 3-1). The commercial shipping traffic lanes appear to avoid the regulated navigation area, indicating that most commercial traffic avoids this area.

3.6.3.2 Local Conditions on the Makah Reservation, including Neah Bay

Demographic data presented in the Employment and Personal Income parts of this section differ from employment and personal income data that will be presented in Section 3.7, Environmental Justice. The data in this section apply to all (non-native and Native American) residents of the Makah Reservation, whereas the data presented in the Environmental Justice section apply only to Native American residents of the Makah Reservation; therefore, the data do not match.

3.6.3.2.1 General Description of the Local Economy

The Makah Reservation, which includes the community of Neah Bay, is relatively isolated. The reservation has been accessible by road only since 1931 and is an approximately 70-mile drive from the closest commercial center in Port Angeles (Sepez 2001). The economy in the coastal region that includes the Makah Reservation is inextricably linked to its natural resources, based primarily on seafood, timber harvesting, pulp and paper production, and tourism (NOAA 1993). Neah Bay, the Makah Reservation's central town, is primarily a commercial fishing and timber community, as well as a tourist and sport fishing destination.

Similar to other locations on the Olympic Peninsula that depend on resource-based industries, the Makah Reservation and Neah Bay have experienced economic difficulties since the late 1980s due to salmon harvest restrictions and controversies surrounding timber practices that have led to reductions in harvest. In addition, the 1989 deactivation of the United States Air Force Base operating on the Makah Reservation resulted in the loss of approximately 200 local jobs, further reducing job opportunities in the local area. Both of these changes, combined with normal fluctuations in the reservation's commercial fishing, sport fishing, and tourism industries, have impaired the Makah Tribe's ability to ensure reliable incomes and subsistence sources for its members (Renker 2002).

Most reservation residents live in Neah Bay, the location of the public school, post office, health clinic, and other services (Renker 2002). Commercial activity on the Makah Reservation includes the businesses shown in Table 3-20, which mainly are located in Neah Bay. Tribal artisans also produce carvings, jewelry, and silk screen designs for sale in local shops and regional galleries (Sepez 2001). Most businesses on the reservation are owned by the Makah Tribal Council or by tribal members. Exceptions include Washburn's General Store, High Tides Seafood, Tommycod Charters, and the Cape Motel and RV Park (Arnold 2005).

3.6.3.2.2 Employment

In 2000, the labor force residing on the Makah Reservation totaled 613 persons, including 464 Native Americans (primarily Makah tribal members), representing 67 percent of the reservation's population 16 years old or older (United States Census Bureau 2002). Unemployment trends and industrial employment data specifically for the Native American population residing on the Makah Reservation are presented and discussed in Section 3.7, Environmental Justice.

TABLE 3-20. BUSINESSES ON THE MAKAH RESERVATION

Accommodations	**Restaurants**
Cape Motel and RV Park[1]	Warmhouse Restaurant
Hobuck Beach RV, Cabins, Campground & Resort	Beebe’s Café
Tyee Motel and RV Park	Natalie’s Pizza
Retail Goods/Services and Fuel	**Fishing Charter Businesses**
Big Salmon Resort (fuel)	Big Salmon Resort (bookings only)
Kim Brown’s Take-Home Fish	Tommycod Charters[1]
Makah Mini-Mart (includes fuel and smoke shop)	
Raven’s Corner Indian Art	
Washburn’s General Store[1]	
Johnson’s Beauty Shop	
Rose’s Interior Decorators	
Cedar Shack Espresso Stand	
Makah Maiden Pantry	
Other Businesses	**Individual Tribal Member Fishing Vessels**
Bunn Construction Co., Inc.	40 longline – troll and gill net
Burley’s Construction	10 small (coastal) trawlers
Cape Flattery Fishermen’s Coop	5 large (whiting) trawlers
High Tide Seafoods[1]	5 gill net (salmon)
Makah Marina	12 small combination vessels (e.g., crab, trollers, longline)
Makah Rock and Gravel	
Makah Housing Authority	
Makah Cultural and Research Center	21 Individual (tribal members) registered fish buyers
Makah Forestry Enterprise	30 individual (tribal members) river fishermen (salmon)
Makah Fisheries Development Foundation	
Makah Bingo	
Ocean Gold Seafood	
Patsy Bain Fish Company	

[1] Indicates non-tribal owned businesses. All other businesses are owned by the Makah Tribe or by tribal members. Businesses are primarily located in Neah Bay.

Sources: Amazon.com 2005; Forks Web 2005; Makah Tribe 2005c; Pamplin 2005b; Manual 2007; Svec 2007, pers.comm.

According to the 2000 United States Census, 468 of the 613 Makah Reservation residents (non-native and Native American together) in the labor force were employed in 2000. Of the 468 Makah Reservation residents with jobs in 2000, 64 percent were employed by government entities, 13 percent were self-employed, and 23 percent were employed by private businesses (United States Census Bureau 2002). This employment distribution points to the importance of the government sector to the economy of the Makah Reservation and Neah Bay. In addition to state and federal employment, the Makah Tribe, which is the largest employer on the reservation, employs approximately 170 persons (Makah Tribe 2005b). Management and professional occupations, many probably related to government employment, accounted for 38 percent of the jobs held by reservation residents in 2000 (Table 3-21). Service, sales, and office occupations together accounted for an additional 34 percent of total jobs. Farming, fishing, and forestry occupations related to the area's natural resources provided jobs for 13 percent of the reservation's employed labor force. The United States Census data may undercount the reservation's employment associated with fishing occupations. According to the Makah Tribe (Svec 2007, pers.comm.), tribal members held approximately 250 commercial fishing jobs in 2006. Other employers on the Makah Reservation include the Indian Health Service medical and dental clinics, with 22 employees, and the Cape Flattery Public Schools, with 61 employees (Makah Tribe 2005b).

TABLE 3-21. EMPLOYMENT BY OCCUPATION OF MAKAH RESERVATION RESIDENTS IN 2000

OCCUPATION	NUMBER	PERCENT (%)
Management, professional, and related occupations	178	38.0
Service occupations	80	17.1
Sales and office occupations	80	17.1
Farming, fishing, and forestry occupations	60	12.8
Construction, extraction, and maintenance occupations	26	5.6
Production, transportation, and material moving occupations	44	9.4
TOTAL	**468**	**100.0**

Note: The table includes both non-native and Native American residents of the Makah Reservation.
Source: United States Census Bureau 2002.

The distribution of employment by industry for residents (non-native and Native American together) of the Makah Reservation in 2000 is presented in Table 3-22.

TABLE 3-22. EMPLOYMENT BY INDUSTRY OF MAKAH RESERVATION RESIDENTS IN 2000

INDUSTRY	NUMBER	PERCENT
Agriculture, forestry, fishing, hunting, and mining	90	19.2
Construction	27	5.8
Manufacturing	3	0.6
Wholesale trade	4	0.9
Retail trade	15	3.2
Transportation, warehousing, and utilities	12	2.6
Information	0	0.0
Finance, insurance, real estate, and rental and leasing	4	0.9
Professional, scientific, management, administrative, and waste management services	13	2.8
Educational, health, and social services	110	23.5
Arts, entertainment, recreation, accommodation, and food services	31	6.6
Other services (except public administration)	9	1.9
Public administration	150	32.1
TOTAL	**468**	**100.0**

Note: The table includes both non-native and Native American residents of the Makah Reservation.
Source: United States Census Bureau 2002.

3.6.3.2.3 **Personal Income**

Personal income levels of Makah Reservation residents (non-native and Native American together) lag behind those of residents throughout Clallam County. According to the United States Census Bureau (2002), the median income of reservation households was $24,100 in 1999, representing only 66 percent of the median countywide household income of $36,450.

In 1999, the per capita income of all reservation residents was also below the countywide level. Based on United States Census Bureau estimates of per capita income, the $11,000 per capita income of Makah Reservation residents was 56 percent of countywide per capita income.

Because Neah Bay is isolated, most of the earnings of local residents come from the wage and salary payments of local businesses. Based on a recent informal survey of businesses in Neah Bay, local businesses generate an estimated annual total payroll of about $21 million (Arnold 2005).

3.6.3.2.4 **Contribution of Tourism to the Local Economy**

Tourism is one of the key elements of the economy of Neah Bay and the Makah Reservation. Visitors are attracted to Neah Bay and the reservation by several activities associated with the area’s cultural, scenic, and recreational offerings.

In the village of Neah Bay, the Makah Cultural and Research Center houses the Makah Museum, which includes permanent exhibits featuring artifacts from the Ozette archeological site. Ozette was an ancient Native American whaling village discovered in 1970 on the Pacific Coast side of the reservation. The museum, which houses the nation’s largest collection of Native American artifacts, is connected to a gift shop that offers visitors carvings, basketry, and jewelry made by Makah artists. The Makah Cultural and Research Center also houses the Makah language program, which is designed to preserve and teach the Makah language (Makah Tribe 2005c).

Neah Bay also offers visitors opportunities for sport fishing charters and guided tours. Several visitor-dependent businesses are located in Neah Bay, including five businesses providing accommodations, three restaurants, several retail shops providing fuel and supplies, and three sport fishing charter businesses (Table 3-20). Although none of the charter boat operators based in Neah Bay advertises whale-watching trips, at least one operation will charter whale-watching if requested (Pamplin 2005b).

Several other tourist and recreation activities are available elsewhere on the Makah Reservation, including vehicle sightseeing tours along forested State Route 113 and the irregular Strait of Juan de Fuca coastline accessed by State Route 112. Many people travel to the coast to watch the annual migration of California gray whales (NOAA 1993). As discussed previously, most whale-watching on and near the Makah Reservation is from land-based locations, with few businesses offering whale-watching tours or charters. Beach activities are available to reservation visitors at sandy beaches near Neah Bay and along Hobuck Beach Road on the outer coast side of the reservation. Camping is available at Hobuck Beach, as well as at the Cape Resort and Silver Salmon Resort in Neah Bay.

Hiking is a popular activity for recreationists visiting the reservation. Popular trails include the 0.75-mile Cape Flattery Trail and the 3.3-mile Shi Shi Trail. The Cape Flattery Trail, with observation decks for viewing the OCNMS, Tatoosh Island, and the Pacific Ocean, is popular with ecotourists and those interested in wildlife viewing opportunities (Makah Tribe 2005c). Wildlife viewing also is available at Flattery Rocks National Wildlife Refuge and the Olympic Coast National Marine Sanctuary. Additionally, the public can view migrating salmon at the Makah National Fish Hatchery, located on the Sooes River on the west side of the reservation (North Olympic Peninsula Visitor and Convention Bureau 2005a).

Sport fisheries and other tourist attractions draw approximately 130,000 visitors annually to the Makah Reservation (Makah Tribe 2005b). The following statistics provide an indication of recent visitation activity.

- The Makah Cultural and Research Center, which includes the Makah Museum, accommodated the following number of non-Makah visitors between 2000 and 2006 (Makah Cultural and Research Center 2005; Makah Cultural and Research Center 2007):
    - 2000: 13,605 people
    - 2001: visitor data not available
    - 2002: 12,272 people
    - 2003: 13,503 people
    - 2004: 11,928 people
    - 2005: 11,907 people
    - 2006: 9,807 people
- The Olympic National Park visitor's center in Neah Bay attracted 10,130 visitors in 2004 (North Olympic Peninsula Visitor and Convention Bureau 2005b).
- The Makah Tribe sold 7,592 recreational permits to non-tribal members visiting the reservation in 2006 (R. Bowechop 2008, pers. comm.). Permit sales from 2002 to 2005 ranged from 7,880 to 9,130 and averaged 8,243 permits sold per year. Sales of permits peak during summer months and are lowest during the winter. Recreation permits are

required for non-tribal persons on the reservation. Permits are sold on a per vehicle basis and are good for a calendar year; this number of permits does not capture the total number of non-tribal persons visiting the reservation in a calendar year, nor does it capture the length of a visit and the number of visits an individual may make to the reservation under a single permit (Peterson 2005).

- The Makah Tribe sold 616 annual recreation fishing permits in 2004 ($12,330 total revenue), 533 in 2005 ($10,672 total revenue), and an estimated 460 in 2006 (approximately $9,210 total revenue) (Sones 2007). The permits, which are sold on an individual basis, allow visitors to fish on rivers within the reservation (Sones 2005).

Persons visiting the Makah Reservation for tourism and recreational purposes generate revenues for businesses in Neah Bay, most of which are owned by tribal members, including the Makah Mini-Mart, the Makah Marina, a tackle shop, two motels and a hostel, 30 recreational vehicle sites, a campground, a general store, two restaurants, and two espresso shops (Makah Tribe 2005b). However, the amount of revenues annually generated by reservation tourism and recreation, as well as the number of jobs and amount of personal income that depend on visitor spending, is not known. According to the United States Census, 46 reservation residents were employed in the retail trade sector and the arts, entertainment, recreation, accommodation, and food services sector, two sectors that depend directly on tourism (Table 3-22). These jobs account for 10 percent of the employment in the local area. Many other local jobs likely are either directly or indirectly supported by tourist spending.

3.6.3.2.5 Contribution of Ocean Sport Fishing to the Local Economy

The diversity and abundance of fish species along the coast are important recreational and commercial resources. Salmon and groundfish (including halibut) fisheries are the primary recreational fisheries within the project area, including the Makah U&A, the OCNMS area to be avoided, and the Coast Guard RNA (Figure 3-1). Recreational fishing for groundfish is concentrated primarily seaward of the entrance to the Strait of Juan de Fuca. The ocean recreational fishery for salmon, which operates out of both Neah Bay and La Push, occurs primarily in the protected waters of the Strait of Juan de Fuca (Beattie 2005).

Ocean sport fishing seasons vary according to species, with seasons adjusted from year to year based on fishery management considerations. The recreational salmon fishery from Cape Alava (near Ozette) north to the United States/Canada border and for the Strait of Juan de Fuca near Neah Bay is generally open from early July until mid-November each year (Pacific Fishery Management Council 2005b). The recreational groundfish season is generally open year-round, although the season is limited for certain species. For example, the halibut season is generally open from mid-May until mid-June, whereas the bottomfish season, including fishing for rockfish, is open year-round (WDFW 2005b). Periodic openings and closing for specific species may occur during the normal fishing season period.

Several fishing derbies and tournaments also draw visitors to Clallam County's sport fisheries each year. Based on information from a search of internet-based websites, annual derbies and tournaments in Clallam County include the Sekiu Salmon Derby in early April, the Port Angeles Halibut Derby over Memorial Day weekend in May, the Sekiu Halibut Derby in early June, the Sekiu Salmon Derby "No Fin, You Win" Derby in mid-September, and the La Push Last Chance Salmon Derby in late September or early October.

Sport fishing facilities located in Neah Bay include the relatively new Makah Marina, which is managed by the Makah Tribal Council. The marina provides permanent moorage slips for about 200 commercial and sport fishing vessels and pleasure craft. The marina also provides utility hookups, restrooms and showers, and a pump-out facility for boats. Boat launching ramps and trailer parking facilities also are available at Big Salmon Resort and West Wind Resort in Neah Bay (Office of the Interagency Committee 2005).

Currently, three sport fishing charter businesses operate in Neah Bay, but charter businesses based elsewhere also fish in Neah Bay and adjacent waters. An estimated five sport fishing charter companies that are open all year operate in and near Neah Bay, but up to approximately 15 charter boats may operate in the Neah Bay area at times (Arnold 2005).

Between 1995 and 2004, the annual number of recreational salmon angler trips originating from Neah Bay ranged from 4,800 trips in 1997 to 26,100 trips in 2004; salmon trips originating from La Push ranged from 600 to 4,600 trips (Table 3-23). The annual number of angler trips targeting groundfish, halibut, and albacore tuna that originated from Neah Bay ranged from 29,000 trips in 1998 to 18,700 trips in 2004 (Pacific Fishery Management Council 2005b).

Based on previous studies of sport fishing in marine (and fresh) waters in the Pacific Northwest (The Research Group 1991; Gentner et al. 2001), spending by anglers who sport fish for salmon and steelhead in marine waters of the Puget Sound is estimated to average approximately $50 per angler day for fishing from private boats and $150 per angler day for fishing from charter boats (in 2000 dollars). Based on data from the Pacific Fishery Management Council (2005b), private boats account for approximately 95 percent of the salmon angler trips originating from Neah Bay, and charter boats account for approximately 5 percent of the trips. Based on these proportions and estimates of average spending per angler trip, sport fishing for salmon originating from Neah Bay between 1995 and 2004 generated trip-related spending ranging from about $264,000 to $1.4 million annually. Using similar assumptions and estimates of average spending per angler day, trips originating from Neah Bay that targeted groundfish, halibut, and albacore tuna generated local spending ranging from about $1.0 million to $1.6 million annually. Washington-resident anglers account for most of this spending.

3.6.3.2.6 Contribution of Ocean Commercial Fishing to the Local Economy

High levels of commercial fishing occur throughout the Strait of Juan de Fuca and near the approach to the strait over Swiftsure Bank and La Perouse Bank (commonly referred to as the Plains). Additionally, pink shrimp trawling occurs between the 100-fathom isobaths of the outer coast. Fish harvested by commercial vessels include five species of salmon, bottomfish, and shellfish (Dungeness crab and pink shrimp). Salmon fisheries, particularly the ocean troll fisheries for Chinook and coho salmon, are managed to safeguard against over-harvest of the least viable individual stocks. Salmon harvest restrictions have severely constrained harvest levels in some years.

In addition to the reservation nearshore and river areas, the Makah Tribe's U&A entirely overlaps the Coast Guard RNA and portions of the OCNMS area to be avoided, and includes the area north of 48^{o} 02' 15" N (Norwegian Memorial) and west of 123^{o} 42' 30" W (Tongue Point) and east of 125 ^{o} 44' 0" W, all within the United States EEZ. Makah tribal commercial fisheries include 20 different fisheries based on species, gear types, and seasons:

- Mid-water (Pacific whiting, yellowtail rock fish)
- Bottom trawl (cod, flatfish)
- Longline (halibut, black cod/sablefish)
- Ocean troll
    - Summer Strait
    - Winter Strait
    - Gill net - sockeye, chum, pink, Coho
    - Set net - Chinook
- Dive fisheries (shell fish, sea cucumbers, sea urchin)
- Dungeness crab (ocean and Strait)

TABLE 3-23. SPORT FISHING ANGLER TRIPS BY SPECIES, 1995 TO 2004

PORT LOCATION/SPECIES GROUP	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Neah Bay										
- Salmon	9,500	10,900		6,400	8,100	11,400	18,100	13,700	20,400	26,100
- Groundfish, halibut, and albacore tuna	23,300	25,800	4,800 27,700	29,000	24,900	24,600	21,200	19,700	26,600	18,700
La Push										
- Salmon	1,500	1,300	900	600	2,900	2,000	3,400	3,400	4,400	4,600
- Groundfish, halibut, and albacore tuna	1,600	1,600	2,200	1,200	1,100	1,500	1,200	1,600	3,600	2,100
All ocean port areas north of Cape Falcon, Oregon[1]										
- Salmon	93,600	69,300	91,700	52,500	108,900	132,200	275,700	191,600	232,600	201,200
- Groundfish, halibut, and albacore tuna	52,000	53,400	54,900	56,200	46,300	46,000	41,600	40,200	52,200	40,800

[1] These data include the ocean port areas of Columbia River and Buoy 10, Westport, La Push, and Neah Bay.

Source: Pacific Fishery Management Council 2005b.

- River set net/hook and line (salmon)
- Tuna
- Sardines (in development)

Commercial ocean fishing seasons vary according to species, with seasons adjusted from year to year based on fishery management. The non-tribal commercial salmon troll fishery from Cape Falcon (near the Oregon/Washington border) north to the United States/Canada border generally is open from early May until late June for all salmon species except coho. Additionally, during some years, the fishery is open for all salmon species from early July until early-to-mid-September. For tribal commercial fishing, including the Makah Tribe, salmon fishing is generally open from early May until mid to late June, and then again from early July until mid-September. Commercial groundfishing is generally open year-round for some species, with seasonal limits imposed on certain species. During the course of any year, periodic openings and closing for specific species may occur during the normal fishing season (Pacific Fishery Management Council 2005b).

The tribes are comanagers of the fisheries resources and are involved in management plan development, monitoring, licensing, and enforcement. Based on the Boldt decision (*United States v. State of Washington* 1974), the management plan allocates a portion of the salmon and steelhead among tribal and non-tribal fishers by region of origin. Additionally, the tribes have recognized treaty rights to other species. Since 1986, the tribes have received a direct halibut allocation from the International Pacific Halibut Commission. Since approximately 1994, the Washington State coastal tribes have received an allocation of black cod (sablefish) from the Pacific Fishery Management Council. That tribal allocation of both halibut and black cod subsequently is divided among the tribes by intertribal agreement. Pacific whiting, rockfish, and groundfish tribal harvest allocations are established on a year-to-year basis by the Pacific Fishery Management Council (Bryant 2007). See Section 3.1.2.1, Makah Tribal Departments and Agencies, and Section 3.1.2.2.2, Makah Fisheries Management Programs, for more information on tribal fisheries management programs.

Commercial fishing is one of the mainstays of the Makah Reservation economy. The Makah Tribe conducts a marine gillnet fishery along the shore near Cape Flattery and in the Strait of Juan de Fuca for Chinook and sockeye salmon. The Makah also participate in a variety of groundfish fisheries. Rockfish, sablefish, Pacific halibut, and whiting are the targeted species and are taken by trawl and longline gear. These fisheries occur year-round, and are centered off the north coast of the Olympic Peninsula.

Currently, 75 commercial vessels, all operated by Makah tribal members, are based out of Neah Bay. Tribal employment related to commercial fishing includes 75 vessel skippers, 145 deckhands, and 30 river fishermen (net setters), for a total of 250 jobs (Svec 2007, pers. comm..).

Commercial landings have varied widely over the last 20 years. Based on data derived from the WDFW commercial catch database, the value of commercial fish landings at the Port of Neah Bay since 2000 has ranged from $4.0 to $5.7 million annually; the tribal (mainly Makah Tribe) share accounts for between 50 and 80 percent of the total landings (Table 3-24). Between 2000 and 2004, groundfish comprised from 65 to 85 percent of the total harvest value of commercial fish landings at Neah Bay (Table 3-24).

The Makah Tribe also participates in the Pacific whiting fishery. Annual allocations to the Tribe have ranged from approximately 16,500 to 38,500 metric tons, with the value of whiting per ton averaging $100. This fishery usually opens around the middle of May and closes at the end of December. Most of whiting caught in the tribal fishery is processed at sea on a processing vessel. Smaller portions of the allocation are delivered to a shoreside processing facility in Westport, Washington. Because virtually no whiting is landed and sold at the port of Neah Bay by tribal or non-tribal fishers, the value of this fishery is not reflected in WDFW's catch database.

The value of all commercial fish landed within the Makah's U&A (including fish landed in both tribal and non-tribal fisheries) is 300 to 400 percent greater than the value of commercial fish landed and processed at the port of Neah Bay (Table 3-24), suggesting that most of the fish caught in the U&A are processed at other ports. Most of the commercial catch of salmon from these catch areas is believed to be landed and processed at Port Angeles (Beattie 2005).

TABLE 3-24. VALUE OF COMMERCIAL FISHING LANDINGS BY SPECIES, 2000 TO 2004 (IN MILLIONS OF NOMINAL DOLLARS)

LANDING LOCATION	2000			2001			2002			2003			2004		
	NON-TRIBAL	TRIBAL	TOTAL	NON-TRIBAL	TRIBAL	TOTAL	NON-TRIBAL	TRIBAL	TOTAL	NON-TRIBAL	TRIBAL	TOTAL	NON-TRIBAL	TRIBAL	TOTAL
Catch Reporting Areas for the Project Area															
Groundfish	6,202.0	1,736.1	7,938.1	6,137.2	1879.9	8,017.1	5,819.3	1,830.5	7,649.8	6,095.3	3,622.8	9,718.1	6,464.7	3,782.4	10,247.1
Salmon	175.7	219.4	395.2	140.6	432.6	573.2	297.8	415.2	713.0	594.0	492.6	1,086.6	696.8	1,225.9	1,922.7
Shellfish	6,423.7	0.4	6,424.1	2,836.8	1.2	2,838.0	2,638.5	--	2,638.5	8,173.3	--	8,173.3	3,525.4	11.8	3,537.2
Other	392.1	10.5	402.6	377.9	23.1	401.0	597.5	30.5	628.0	393.9	28.8	422.7	345.1	35.0	380.1
TOTAL	**13,193.0**	**1,966.5**	**15,160.0**	**9,492.5**	**2,336.7**	**11,829.0**	**9,353.1**	**2,276.1**	**11,629**	**15,256.0**	**4,144.2**	**19,400**	**11,032.0**	**5,055.1**	**16,087.0**
Port of Neah Bay															
Groundfish	1,725.3	1,711.3	3,436.6	1,248.6	1,891.4	3,134.0	1,732.8	1,882.0	3,614.9	1,328.0	3,078.4	4,406.3	565.3	2,486.3	3,051.5
Salmon	62.9	52.2	115.1	46.0	22.4	68.4	77.6	30.2	107.8	68.4	28.3	96.8	13.2	18.6	31.8
Shellfish	125.1	368.5	493.6	86.4	698.7	785.1	227.3	464.6	691.8	483.6	518.6	1,002.2	296.4	1,296.3	1,592.7
Other	--	--	--	--	--	--	1.3	4.1	5.4	250.7	--	250.7	--	8.6	8.6
TOTAL	**1,913.3**	**2,132.0**	**4,045.4**	**1,381.0**	**2,612.5**	**3,993.5**	**2,038.9**	**2,380.9**	**4,419.8**	**2,130.8**	**3,625.3**	**5,756.1**	**874.9**	**3,809.7**	**4,684.7**
All Washington Ports															
Groundfish	6,290.2	1,790.3	8,080.5	6,239.0	1,919.6	8,158.6	5,973.5	1,894.8	7,868.2	6,167.6	3,673.3	9,840.9	6,542.3	3,827.9	10,370.2
Salmon	585.1	248.1	833.2	651.9	113.9	765.9	770.2	145.0	915.2	470.9	69.8	540.7	462.0	65.6	527.6
Shellfish	239.3	549.2	788.4	380.9	772.6	1,153.5	751.3	692.3	1,143.6	985.7	713.0	1,698.7	1,181.3	1,840.2	3,021.5
Other	6,433.1	9.7	6,442.7	2,851.0	26.4	2,877.4	2,651.4	23.6	2,675.0	8,208.7	17.1	8,225.8	4,284.9	26.8	4,311.7
TOTAL	**13,548.0**	**2,597.3**	**16,144.0**	**10,123.0**	**2,832.5**	**12,955.0**	**10,146**	**2,755.7**	**12,902**	**15,832.0**	**4,473.3**	**20,306**	**12,470.0**	**5,760.5**	**18,231.0**

[1] Catch reporting areas vary by species and do not correspond very closely with the U&A for the Makah Tribe. Refer to Figure 1-1 for a graphical depiction of the geographic correspondence.

Note: Totals are subject to rounding.

Source: WDFW, commercial catch database.

3.6.3.3 Gray Whale Economic Values

3.6.3.3.1 <u>Summary of Economic Effects of the Makah Gray Whale Hunts</u>

No quantitative information is available concerning the economic effects of the Makah Tribe's practice whale hunt exercises in late 1998, or their whale hunting in the spring of 1999 and of 2000, but anecdotal information from media coverage of the hunts on protest and media activity and subsequent tourism-related effects provides some indication of the impacts on the local economy.

As described in more detail in Section 3.13, Transportation, news accounts indicate that protests and media coverage of the practice whale hunt exercises in 1998 and the hunts in 1999 and 2000 temporarily generated an increase in the number of people potentially seeking accommodations and services in the communities of Neah Bay, Clallam Bay, and Sekiu. The change in local economic activity during these periods is, however, difficult to assess based on available information. For example, based on one account (Sullivan 2000), rooms at the Cape Motel and all other motels in Neah Bay were booked by television stations and newspaper staff during the attempted whale hunts in October 1998. In an article published in the *Seattle Times* on October 8, 1998 (Mapes 1998a), however, it was noted that, "One of the biggest surprises of this hunt has been the small turnout of protesters," although the article may have been referring to the demand for accommodations in and near Neah Bay rather than the actual number of protesters near the hunt. According to the article, which noted that protesters were primarily staying in Sekiu, "Campgrounds are empty, and some motels still have vacancies." The same article reported that about 40 media representatives from all over the world were in the Neah Bay area covering the possible whale hunt during October 1998. During the May 1999 whale hunt, which occurred on four days of one week, the journalists who took up temporary residence on the reservation hired a boat to transport them to the hunting grounds (Sepez 2001). Protesters again arrived in the Neah Bay area during whale hunts in spring 2000 (Oldham 2003). Comparing the spring 1999 and 2000 hunts, the number of protesters decreased from a peak of 50 people during the 1999 whale hunt to a core group of less than 24 people (Welch 2000). Groups of protesters (numbering up to 40 people) staged weekly protests near the Makah Reservation boundary, sometimes temporarily blocking State Route 112, the only paved route to the Makah Reservation, during the 1999 and 2000 hunts (Mapes and Solomon 1999a; United States Coast Guard 1999b; *Seattle Post-Intelligencer* 2000).

In addition to onsite protests, the Makah whale hunts generated calls for boycotts of Makah tribal enterprises and Washington State products by some groups and individuals opposing the hunts. For example, as early as 1997, members of the Sea Shepherd Conservation Society, a leading opponent of the hunts, reportedly suggested calling for a boycott of tourism on the Olympic peninsula (Westneat 1997). Again, in 1998, it was reported that some activists threatened to organize a boycott of Olympic Peninsula tourism (Simon 1998), although organized boycotts apparently never materialized. In March 1999, an Australian-based animal-rights group called Australians for Animals launched an international boycott of apples produced in Washington State to protest the Makah Tribe's whale hunts, with the group's president claiming that over 1 million people had signed onto the boycott; however, the boycott apparently had no immediate effect on sales of Washington apples (Mapes 1999). Additionally, the Makah Nation was reportedly listed as the target of a boycott by Co-Op America, an economic action group that teaches individuals how to invest in environmentally responsible ways (Glass 2000). No information is available to determine whether any of the individual or group calls for boycotts had any effect on Makah tribal enterprises, Olympic Peninsula tourism, or Washington State commerce.

Anecdotal information suggests that any economic effects on tourism may have been minor, as reported in a *Seattle Times* article in August 1999 (Associated Press 1999). Gordon Bentler, the owner of the Cape Motel in Neah Bay, was quoted in the article as saying, "I've noticed no drop. In fact, I think we're probably up this year over last." Also quoted in the article was Rick Hert, executive director of the North Olympic Peninsula Visitor and Convention Bureau, who indicated that room-tax figures from Clallam County hotels and motels appeared relatively flat during the summer of 1999. Last, Bob Buckingham, manager of the marina in Neah Bay, was quoted as saying, "We haven't seen any sign of that [the hunt] affecting us out here. Our actual marina revenue is up from last year so far. We're getting quite a bit of tourism up here."

3.6.3.3.2 Commercial Value of Whales

In the past, whales were valued worldwide as a commercial resource, primarily to satisfy the global demand for whale oil, but also for human and animal foods, fertilizer, leather, and pharmaceuticals (Freeman and Kreuter 1994). Commercial whaling resulted in widespread depletion of many whale species, so governments began to develop regulations and policies to sustain and conserve the whale resource (Section 3.4.3.2.2, Protection and Recovery after Commercial Exploitation, for more information about the development of legal protections). Though a moratorium on commercial harvest of gray whales and right whales had been in place since 1937 and was reaffirmed in the 1946 ICRW, commercial harvests of other whale species occurred as late as the 1970s and early 1980s. In December 1971, the United States banned all commercial whaling by United States nationals and sought an international moratorium on the commercial killing of all whales in the IWC arena starting in 1972 (16 USC 916 note, Public Law 96-60, August 15, 1979). As noted in Section 3.12, Aesthetics, Congress found that “whales are a unique marine resource of great aesthetic and scientific interest to mankind” and declared that “the protection and conservation of whales are of particular interest to citizens of the United States” (16 USC 916 note, Public Law 96-60, August 15, 1979). Congress also found that “marine mammals have proven themselves to be resources of great international significance, aesthetic and recreational as well as economic” (16 USC 1361(6)). The IWC adopted the commercial whaling moratorium in 1982, and implemented it in 1986. Some commercial whaling does exist today; Norway conducts commercial whaling under an objection to the ICRW’s commercial whaling moratorium (see information about Article V.3 objections in Section 1.2.4.1.1, Functions and Operating Procedures of the IWC). Iceland and Japan conduct scientific whaling under Article VIII of the ICRW, but not for gray whales.

More recently, whales have become a commercial resource for the whale-watching industry, a fast-growing tourist activity in several regions of the world (Freeman and Kreuter 1994). In 1994, Kalland reported that participants at a marine mammal conference in 1980 estimated the non-lethal commercial value of cetaceans to be about $100 million dollars, approximately the same value as commercial whaling industries of the day (Kalland 1994). He noted that commercial whaling had largely ceased, and the non-lethal commercial value of whales had increased. About a decade later, Hoyt (2001) reported that whale-watching (including vessel-based whale-watching and whale-based tourism out of ‘dolphinaria,’ where some places market swimming with whales) was still on the rise. The number of whale watchers worldwide more than doubled between 1991 and 1998, from 4 to 9 million people per year, and the total expenditures increased from $504 million in 1994 to $1 billion in 1998 (Hoyt 2001). Since 1994, the United States has claimed more than a million whale watchers, and other countries, including Canada, joined the ‘million whale watch club’ around 2001 (Hoyt 2001).

Some people who commented during public scoping expressed their concerns that a gray whale hunt would affect revenues of the local, regional, and west-coast-wide whale-watching industries by causing whales to avoid boats. Although whale-watching was not one of the activities included in the Lillstrom and Associates (2003) study (Section 3.6.3.1.3, Tourism), it is among the attractions that draw visitors to Clallam County (NOAA 1993). Much of the whale-watching in Clallam County is done from land-based locations along its seashore. Few operators in Clallam

County advertise whale-watching tours or charters, although whale-watching charters are available through one resort in Sekiu and may be available through some sport fishing boat operators. Whale-watching is also possible from the two passenger ferries that run between Port Angeles and Victoria.

Whale-watching primarily occurs during autumn and spring, corresponding with the annual southern and northern migrations of the gray whale. Poor weather conditions often make viewing difficult during the fall/winter southward migration. During the spring/summer northward migration, land-based whale-watching opportunities are good from several locations, including Cape Flattery on the Makah Reservation; Shi Shi Bluffs, south of the Makah Reservation; Cape Alava, near the Ozette Indian Reservation on the outer coast; and at La Push on the outer coast (Great Pacific Recreation & Travel Maps 2000).

Outside of Clallam County, whale-watching is an important tourist activity off Westport, located on Washington's Pacific coastline at Grays Harbor, approximately 80 miles south of the Makah U&A. Whale-watching trips originating from Westport occur from March to May, when gray whales can be viewed just off the coast during their annual migration to northern feeding grounds. Most of Westport's 11 charter boat businesses offer whale-watching trips during this period, along with halibut, bottomfish, salmon, and tuna fishing charter trips at various times throughout the year (WestportWa.com 2006). Whale-watching trips range from $20 to $30 per person and generally last 2.5 hours, with many of the charter operators guaranteeing that clients will see a gray whale during their trip (WestportWa.com 2006).

Whale-watching is also an important tourist activity off Vancouver Island. On southern Vancouver Island, whale-watching operators are largely based in Victoria, Vancouver Island's largest city, but a few operators are also based in smaller communities, including Port Renfrew, at the mouth of the Strait of Juan de Fuca, and Sidney and Duncan, on Vancouver Island's southeast shore north of Victoria. Whale-watching operators also reside in Tofino and Ucluelet, located on Vancouver Island's southwest shore.

On southern Vancouver Island, 16 businesses are known to offer whale-watching tours or charters operating out of Victoria, two businesses operating out of Sidney, and one business operating out of both Port Renfrew and Duncan. Several of these operators provide saltwater fishing charters, as well as whale-watching. Tours and charters primarily occur in nearby waters, including the Strait of Juan de Fuca, waters off the Gulf and San Juan Islands, and waters offshore of the city of Vancouver. The whale-watching tours and charters provided by operators focus largely on opportunities for viewing orcas (also called killer whales) that are part of three orca pods, known as the southern resident pods. The high season for whale-watching operators is mid-April through mid-October, when the orcas are most visible and the seas are calmer. In addition to offering orca viewing opportunities, most operators also advertise opportunities for viewing other wildlife, including gray whales, humpback whales, Minke whales, porpoises, seals, sea lions, and otters (BritishColumbia.com 2005; Whale Watch Operators Association Northwest 2005).

On southwest Vancouver Island, 12 businesses are known to offer whale tours operating out of Tofino and Ucluelet (tofino-bc.com 2007). Tours out of Tofino generally operate in the waters of Clayoquot Sound, while tours out of Ucluelet generally operate in the waters of Barkley Sound. Some tours also include the waters off the western coast of Vancouver Island; none of the operators describes tours that include the Strait of Juan de Fuca, which is 50 miles southeast of Ucluelet. Most tour operators primarily offer opportunities to view gray whales, in addition to opportunities to view orcas and humpback whales. The tours focusing on migrating gray whales typically are offered in March and April. Tours to see locally feeding gray whales during the summer feeding period are available from April until October or November. In addition to whale-watching trips, several operators in Tofino and Uclueolot offer tours to view other wildlife, including sea lions, seals, sea otters, and birds. Some operators also offer bear-watching tours and fishing charters.

3.7 Environmental Justice

3.7.1 Introduction

The primary issue of concern addressed in this section is the extent to which the proposed action would disproportionately affect minority and low-income populations. United States Census data from 2000 are used to describe existing conditions for population, employment, personal income, and poverty characteristics of minority and low-income populations in Clallam County, with particular focus on tribal communities within the county. Makah Tribe (Makah Tribe 2005b) data on employment, personal income, and poverty supplements the United States Census material. These data form the basis for identifying minority and low-income populations, as well as assessing the relative severity of the proposed action's potential impacts on these communities and economies regarding changes in income, employment, net economic value, and direct and indirect sociological impacts. Unlike Section 3.6, Economics, the information and data provided in this section on Environmental Justice excludes non-native persons residing on reservations. Thus, the data provided in the two sections are not directly comparable.

3.7.2 Regulatory Overview

Executive Order 12898, *Environmental Justice*, requires that federal agencies "identify and address the . . . disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Based on assessment of the demographic data presented later in this section and preliminary analysis of the type and location of effects potentially resulting from the proposed action, the environmental justice analysis for the proposed action focuses on Clallam County's Native American population.

The EPA Office of Civil Rights and Environmental Justice developed guidance for all federal agencies conducting environmental justice analyses. This environmental justice analysis follows the EPA guidelines. The EPA environmental justice guidelines offer a range of categories to indicate the presence or absence of environmental justice effects (EPA 1998). Consequently, this indicator-based assessment draws topically from the range of indicator categories EPA (1998) outlined, from information provided in other sections of this environmental impact statement, and from other information relevant to the circumstances of the tribal communities.

3.7.3 Existing Conditions

Existing conditions for the environmental justice analysis are based on information on minority populations in Clallam County. This includes information on demographics, employment, personal income, and poverty characteristics of these populations.

3.7.3.1 Minority Populations

The following sections provide information on the size and demographic characteristics of minority populations in Clallam County, including Native American populations and the Makah Tribe.

3.7.3.1.1 Clallam County

In 2000, Clallam County's population totaled approximately 64,500 residents, with 40 percent of the population residing in the county's unincorporated areas. Among the county's incorporated communities, the largest is Port Angeles, with 18,400 residents, followed by Sequim and Forks, with populations of 4,300 and 3,100 people, respectively (United States Census Bureau 2002).

The population of Clallam County is largely white, with whites accounting for 89.1 percent of the county's residents in 2000 (Table 3-25). American Indians and Alaska Natives (hereafter referred to as Native Americans) are the only other relatively large racial group in the county. The 3,303 Native Americans residing in Clallam County in 2000 accounted for 5.1 percent of the countywide population. Together, all other racial groups accounted for only 5.8 percent of the population. Hispanics, who can be categorized as members of other racial groups for the purposes of the United States Census, accounted for 3.4 percent of the county's population in 2000.

TABLE 3-25. RACIAL DISTRIBUTION OF CLALLAM COUNTY POPULATION IN 2000

RACE	NUMBER	PERCENT (%)
White	57,505	89.1
Native American[1]	3,303	5.1
Asian[1]	731	1.1
Black[1]	545	0.8
Native Hawaiian and other Pacific Islander[1]	104	0.2
Some other race[1]	761	1.2
Two or more races	1,576	2.5
Total	64,525	100.0
Hispanic or Latino[2]	2,203	3.4

[1] This includes persons reporting only one race.

[2] For purposes of the United States Census, Hispanics or Latinos may be of any race, so they are already included in other applicable race categories in the table.

Source: United States Census Bureau 2002

3.7.3.1.2 County Tribal Demographics

Four Native American reservations are located in Clallam County: the Makah Reservation, encompassing Neah Bay; the Jamestown S'Klallam Reservation and off-reservation trust lands at Blyn near Sequim; the Lower Elwha Reservation and off-reservation trust lands west of Port Angeles; and the Quileute Reservation at La Push. Additionally, the Hoh Tribe maintains a business committee office in Forks, although the Tribe's reservation is located near Oil City in Jefferson County. The Quinault Tribe, whose reservation is in Grays Harbor County, also has an administrative office in Forks.

Together, the population of Clallam County's four reservations totaled 2,058 persons, including 1,640 persons of Native American ancestry alone, in 2000 (Table 3-26). Non-tribal members also live on reservation properties, including those married to tribal members and those with jobs on the reservation. According to United States Census data, an additional 1,663 Native Americans in Clallam County lived outside of reservation and trust land properties in 2000. Among the four reservations in the county, Native American populations ranged from 2 people on the Jamestown S'Klallam Reservation to 1,083 people on the Makah Reservation.

TABLE 3-26. POPULATION OF AMERICAN INDIAN RESERVATIONS AND TRUST LANDS IN CLALLAM COUNTY IN 2000

RESERVATION	TOTAL POPULATION	AMERICAN INDIAN[2]
Makah	1,356	1,083
Quileute	371	307
Lower Elwha[1]	315	248
Jamestown S'Klallam[1]	16	2
TOTAL	**2,058**	**1,640**

[1] This includes the population on off-reservation trust lands.
[2] This includes Native Americans reporting only one race.
Source: United States Census Bureau 2002

Table 3-27 contains selected demographics for Native Americans residing on the four reservations in Clallam County. The most notable characteristic of reservation demographics is the youthful nature of their populations. With the exception of the Jamestown S'Klallam Reservation, which had only two Native American residents in 2000, the median age of the Native American populations was well below the median age of 43.8 years for all residents in Clallam County in 2000. The median age of reservation populations ranged from 20.6 years for the Lower Elwha Reservation to 26.3 years for the Quileute Reservation (Table 3-27).

Differences also exist in the average household and family sizes of the reservation populations, which were higher than the countywide averages of 2.31 persons per household and 2.78 persons per family in 2000. Excluding the Jamestown S'Klallam Reservation, average household size ranged from 2.84 on the Quileute Reservation to 3.67 on the Lower Elwha Reservation. Average family sizes ranged from 3.34 on the Quileute Reservation to 3.97 on the Lower Elwha Reservation (Table 3-27).

TABLE 3-27. SELECTED DEMOGRAPHICS OF NATIVE AMERICANS RESIDING ON RESERVATION AND TRUST LANDS IN CLALLAM COUNTY IN 2000

CATEGORY	MAKAH RESERVATION[1]	QUILEUTE RESERVATION[1]	LOWER ELWHA RESERVATION AND TRUST LANDS[1]	JAMESTOWN S'KLALLAM RESERVATION AND TRUST LANDS[2]
Male	54.1%	55.3%	45.3%	50.0%
Female	45.9%	44.7%	54.7%	50.0%
Median age (years)	24.7	26.3	20.6	43.0
Under 18 years of age	37.9%	38.7%	46.1%	25%
Over 65 year and over	4.7%	6.0%	2.3%	25%
Average household size (persons)	2.95	2.84	3.67	2.29
Average family size (persons)	3.44	3.34	3.97	2.60
Owner-occupied housing units	69.9%	89.7%	94.7%	71.4%
Renter-occupied housing units	30.1%	10.3%	5.3%	28.6%

[1] Data represent Native Americans reporting only one race. Non-native residents living on reservations are excluded in this state.

[2] Because of the small size of the Native American population residing on the Jamestown S'Klallam Reservation and trust lands, the data represent the entire population of the reservation and trust lands, rather than Native Americans alone.

Source: United States Census Bureau 2002

3.7.3.1.3 Makah Tribe

The United States Census Bureau (2002) reported that 1,083 Native Americans lived on the Makah Reservation in 2000, compared to 940 Native Americans in 1990 and 803 Native Americans in 1980. An additional 273 non-tribal persons lived on the reservation in 2000, including those married to tribal members and others who work for government agencies. Not all members of the Makah Tribe live on the Makah Reservation. Tribal enrollment, which includes the total number of tribal enrollees certified as being tribal members by the Tribe's leader or designee, was 2,389 members in January 2001, including about 1,200 tribal members who lived off the reservation (Makah Tribe 2005b). Table 3-27 shows selected demographics for American Indians living on the Makah Reservation.

Neah Bay, an isolated fishing and timber community of 794 persons, is the population center of the Makah Reservation, accounting for nearly 60 percent of the reservation's population in 2000 (United States Census Bureau 2002). Most of the Makah residing on the reservation live in Neah Bay, though some live in the reservation's hilly regions and along the road that runs south along the Pacific Ocean side of the reservation (Sullivan 2000).

3.7.3.2 Minority Employment

The sections below provide information regarding minority employment potentially affected by the Makah's proposed gray whale hunts.

3.7.3.2.1 Clallam County

In 2000, Clallam County's minority civilian labor force totaled 2,643 persons (Table 3-28), representing 10 percent of the county's civilian labor force. Hispanics, who, for the purposes of the United States Census, may be categorized as members of other racial groups, had 810 persons in the labor force, accounting for 3.1 percent of the county's total labor force.

Unemployment for minorities in Clallam County is generally higher than for those in the overall countywide population. In 2000, the county's minority population had an unemployment rate of 14.0 percent at the time of the United States Census, compared to a countywide unemployment rate of 7.7 percent. Hispanics, who can be categorized as members of other racial groups for the purposes of the United States Census, have lower unemployment figures than other minorities, at 12.3 percent.

TABLE 3-28. LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT FOR CLALLAM COUNTY MINORITY AND NATIVE AMERICAN POPULATIONS IN 2000

	CLALLAM COUNTY					
CATEGORY	ALL MINORITY PERSONS[1]	HISPANICS OR LATINOS[2]	MAKAH[3]	QUILEUTE[3]	LOWER ELWHA[3]	JAMESTOWN S'KLALLAM[4]
In civilian labor force	2,643	810	464	122	96	13
Employed	2,266	710	336	95	78	13
Unemployed	385	100	128	27	18	0
Unemployment rate (%)	14.6	12.3	27.6	22.1	18.8	0.0

[1] This includes Blacks, Native Americans, Asians, Native Hawaiian and other Pacific Islanders, persons of some other race, and persons of two or more races.

[2] For purposes of the United States Census, Hispanics or Latinos may be of any race, so they are already included in other applicable race categories in the table.

[3] Data represent Native Americans on reservations reporting only one race. Non-native residents on reservations are excluded from this table.

[4] Because of the small size of the Native American population residing on the Jamestown S'Klallam Reservation and trust lands, the data represent the entire population of the reservation and trust lands, rather than Native Americans alone.

Source: United States Census Bureau 2002

3.7.3.2.2 County Tribal Employment

Native Americans residing on the reservations of Clallam County's four tribes had a labor force of 695 persons in 2000, with 522 of these persons employed (Table 3-28). About two-thirds of the tribal labor force resided on the Makah Reservation, with virtually all of the remaining tribal labor force living on the Quileute and Lower Elwha Reservations. Together, Native Americans on the four reservations had an unemployment rate of 24.9 percent in 2000, much higher than the 7.7 percent rate countywide and the 14.6 percent rate for all minority groups combined in Clallam County. The difference in unemployment rates between Native Americans and the general population in the county may be higher than that reported by the United States Census, because some tribal members may have been available for work, but dropped out of the labor force because of the lack of nearby employment opportunities.

Government employment is important to Native Americans living on the county's four reservations (

Table 3-29). Two industrial sectors linked to government, the public administration sector and the educational, health, and social services sector, generated more than half of all jobs for reservation tribal members in 2000, including 55 percent of the jobs for the Makah Reservation, 46 percent of the jobs for the Lower Elwha Reservation, and 44 percent of the jobs for the Quileute Reservation. Industries related to agriculture, forestry, fishing, hunting, and mining are also important to the reservations, accounting for 19 percent of all job opportunities in 2000.

3.7.3.2.3 Makah Tribe

In 2000, the labor force of Native Americans (primarily Makah and excluding non-native residents) on the Makah Reservation totaled 464 persons, representing 66 percent of the population 16 years old or older (United States Census Bureau 2002). This labor force participation rate was about the same as the rate in 1990 and 1980 (United States Census Bureau in Northwest Area Foundation 2005).

As Table 3-28 shows, 336 Native Americans on the Makah Reservation had jobs in 2000. The census data indicate that 27.6 percent of the tribal labor force was unemployed that year, an unemployment rate substantially higher than the 7.7 percent rate countywide. While relatively high, the tribal unemployment rate suggested by the census data is much lower than unemployment rates reported by the Makah Tribe and the Bureau of Indian Affairs for recent years. Based on the Tribe's estimates of how many of its residents were available for work, but were unemployed, tribal unemployment rates have ranged from an estimated 48 percent in 1991 to 70 percent in 2001 (Bureau of Indian Affairs, Office of Tribal Services, in Northwest Area Foundation 2005).

TABLE 3-29. EMPLOYMENT BY INDUSTRY OF NATIVE AMERICAN RESIDENTS AT CLALLAM COUNTY IN 2000

	Makah Reservation[1]		Quileute Reservation[1]		Lower Elwha Reservation[1]		Jamestown S'Klallam Reservation[2]	
Industry	Number	Percent (%)	Number	Percent (%)	Number	Percent (%)	Number	Percent (%)
Agriculture, forestry, fishing, hunting, and mining	80	23.8	13	13.7	6	7.7	0	0.0
Construction	16	4.8	0	0.0	4	5.1	0	0.0
Manufacturing	0	0.0	5	5.3	3	3.8	1	7.7
Wholesale trade	2	0.6	1	1.1	6	7.7	0	0.0
Retail trade	11	3.3	9	9.5	0	0.0	0	0.0
Transportation, warehousing, and utilities	5	1.5	3	3.2	4	5.1	0	0.0
Information	0	0.0	0	0.0	2	2.6	0	0.0
Finance, insurance, real estate, and rental and leasing	4	1.2	0	0.0	0	0.0	3	23.1
Professional, scientific, management, administrative, and waste management services	7	2.1	4	4.2	6	7.7	0	0.0
Educational, health, and social services	67	19.9	25	26.3	12	15.4	2	15.4
Arts, entertainment, recreation, accommodation, and food services	20	6.0	10	10.5	8	10.3	3	23.1
Other services (except public administration)	6	1.8	8	8.4	3	3.8	2	15.4
Public administration	118	35.1	17	17.9	24	30.8	2	15.4
TOTAL	**336**	**100.0**	**95**	**100.0**	**78**	**100.0**	**13**	**100**

[1] Data represent Native Americans on reservations reporting only one race. Non-native residents on reservations are excluded from this table.

[2] Because of the small size of the Native American population residing on the Jamestown S'Klallam Reservation and trust lands, the data represent the entire population of the reservation and trust lands, rather than Native Americans alone.

Source: United States Census Bureau 2002

Due to the seasonal nature of the reservation's tourist and fishing industries, unemployment is generally much higher during winter months than during the summer (Sullivan 2000).

According to the 2000 United States Census, three industrial sectors of the local economy provided three-quarters of the jobs held by tribal members in 2000. As discussed previously, two sectors associated with government activity, the public administration sector and the educational, health, and social services sector, together generated more than half of the employment opportunities for reservation tribal members (

Table 3-29). Additionally, the industrial sector most closely related to the area's natural resources, the agriculture, forestry, fishing, hunting, and mining sector, provided 24 percent of the jobs held by Native Americans on the reservation. Note that the census, which reported 80 jobs in this sector, may have underestimated the fishing-related employment in this sector. According to Makah Fisheries Management (Svec 2007, pers. comm.), commercial fishing alone currently generates 250 jobs for tribal members, suggesting that commercial fishing may generate about one-third of the jobs held by tribal members. This fisheries-related employment is seasonal in nature.

3.7.3.3 Personal Income and Poverty Levels

The sections below provide information on personal income and poverty levels in Clallam County.

3.7.3.3.1 Clallam County

The income of minority populations in Clallam County is generally lower than that of the countywide population. According to United States Census Bureau (2002) income data, the median household income (household income includes the income of all persons considered part of an individual household) for the overall population in Clallam County was $36,449 in 1999. The median household income was lower for all minority populations other than Blacks and Asians (Table 3-30). For Native Americans and Hispanics, the county's two largest minority groups, the median household income was approximately 24.0 percent lower than it was countywide.

The income differences between Clallam County's minority populations and its countywide population were even greater on a per capita income basis (per capita income is the total income of an area or population averaged across all persons within an area or population). In 1999, per capita incomes for minority populations ranged from $9,593 for Hispanics to $18,072 for Asians, compared to per capita income of $19,517 for the countywide population (Table 3-30). For

Native Americans and Hispanics, per capita income levels were 42.1 percent and 50.8 percent lower, respectively, than countywide per capita income.

TABLE 3-30. INCOME AND POVERTY STATUS OF MINORITY POPULATIONS IN CLALLAM COUNTY IN 1999

RACIAL CATEGORY	MEDIAN HOUSEHOLD INCOME ($)	PER CAPITA INCOME ($)	INDIVIDUALS BELOW POVERTY LEVEL	
			NUMBER	PERCENT
Native American[1]	27,652	11,305	828	26.7
Asian[1]	44,583	18,072	93	11.8
Black[1]	40,893	15,813	33	21.7
Native Hawaiian and other Pacific Islanders[1]	34,167	10,643	21	46.7
Some other race[1]	22,188	8,230	267	36.5
Two or more races	28,177	10,410	382	23.2
Total	NA	NA	1,624	25.1
Hispanic or Latino[2]	27,750	9,593	642	33.0

NA = not applicable.

[1] This includes persons reporting only one race.

[2] For purposes of the United States Census, Hispanics or Latinos may be of any race, so they may already be included in other applicable race categories in this table.

Source: United States Census Bureau 2002

With the exception of the Asian population, all minority populations in Clallam County had poverty rates exceeding the countywide rate of 12.5 percent in 1999. The highest poverty rates were for Native Hawaiian and Other Pacific Islanders at 46.7 percent and Hispanics at 33.0 percent (Table 3-30).

3.7.3.3.2 <u>County Tribal Income</u>

As discussed in Section 3.7.3.3, Personal Income and Poverty Levels, median household income and per capita income were lower for the Native American population in Clallam County than for the general countywide population in 1999. Additionally, the poverty rate for all Native Americans residing in Clallam County, at 26.7 percent in 1999, was higher than the countywide rate of 12.5 percent (Table 3-30).

For those Native Americans living on Clallam County's four tribal reservations, median household and family income were much lower than countywide income levels in 1999. Reservation median household income was from 14.3 to 41.5 percent lower than the county's $36,449 median household income (Table 3-31). Similarly, median family income for reservation families was from 28.2 percent to 50.2 percent lower than the countywide median family income of $44,381.

TABLE 3-31. INCOME AND POVERTY STATUS OF NATIVE AMERICAN RESIDENTS ON RESERVATIONS IN CLALLAM COUNTY IN 1999

CATEGORY	MAKAH RESERVATION[1]	QUILEUTE RESERVATION[1]	LOWER ELWHA RESERVATION AND TRUST LANDS[1]	JAMESTOWN S'KLALLAM RESERVATION AND TRUST LANDS[2]
Median household income ($)	21,316	22,125	31,250	60,625
Median family income ($)	25,893	22,000	31,875	61,875
Per capita income ($)	9,835	9,104	8,082	28,238
Percent of families below poverty level (%)	28.9	34.2	31.1	0.0
Percent of individuals below poverty level (%)	31.3	31.7	33.2	0.0

[1] Data represents Native Americans reporting only one race. Non-native residents at reservations are excluded from this table.

[2] Because of the small size of the Native American population residing on the Jamestown S'Klallam Reservation and trust lands, the data represent the entire population of the reservation and trust lands rather than Native Americans alone.

Source: United States Census Bureau 2002

A larger disparity between tribal and countywide income exists for per capita income. In 1999, per capita income for tribal reservation members ranged from $8,082 for the Lower Elwha Reservation to $9,835 for the Makah Reservation (Table 3-31). These income levels are approximately half the $19,517 in per capita income for the countywide population in 1999. Census income and poverty statistics for the Jamestown S'Klallam Reservation are not discussed in this section, although they are presented in Table 3-31, because of the small number of persons residing on the reservation.

Given the disparity in incomes, poverty rates for tribal reservation families and individuals are substantially higher than for the general countywide population (the poverty rate is the percentage of families or individuals living below the poverty thresholds established each year by the United States Office of Management and Budget). In 1999, the percentage of tribal reservation families with incomes below the federal poverty threshold ranged from 28.9 percent to 34.2 percent, compared to 8.9 percent of families countywide (Table 3-31). For tribal individuals, poverty rates ranged from 31.3 to 33.2 percent, much higher than the countywide poverty rate of 12.5 percent.

3.7.3.3.3 Makah Tribe

Native Americans living on the Makah Reservation have substantially lower incomes and experience higher poverty rates than residents throughout Clallam County. According to the United States Census Bureau, the median household income of Native Americans on the Makah

Reservation was $21,300 in 1999 (Table 3-31), 42 percent lower than countywide median household income. Relative to all reservations in the United States, the median income of tribal households on the Makah Reservation has been falling over the past two decades. In 1979, the median household income of American Indians on the Makah Reservation was 48 percent higher than the median household income of all United States reservations. By 1999, this relationship reversed, with median household income on the Makah Reservation 2 percent lower than median household incomes for all reservations (United States Census Bureau in Northwest Area Foundation 2005).

Similar to household income, the per capita income of Makah Reservation tribal members is lower than per capita income countywide, registering 50 percent of the countywide level in 1999. The disparity in income levels explains the relatively high poverty rates for Native Americans residing on the Makah Reservation. In 1999, 28.9 percent of the Native American families residing on the Makah Reservation fell below the federal poverty level compared to 8.9 percent of all families in Clallam County (Table 3-31). Poverty figures for individuals were similar to those for families, with 31.3 percent of the Makah Reservation's tribal members living below the poverty level compared to 12.5 percent of all individuals in Clallam County.

According to the Makah Tribe (2005a), several families and individuals on the reservation depend on federal assistance, including 52 families receiving temporary assistance for needy families, 62 families receiving food stamps, and 106 individuals receiving medical coupons.

3.7.3.4 Outreach to Minority and Low-Income Populations

Outreach to minority and low-income populations was part of the overall scoping process NMFS conducted for the Makah Whale Hunt EIS. Chapter 1 of this EIS contains a description of the scoping process in Section 1.5.1, Scoping Process, as does the scoping report associated with this EIS (NMFS 2007a).

3.8 Social Environment

3.8.1 Introduction

This section discusses the social environment, the complexity of emotions and attitudes of people and communities potentially affected by the Makah whale hunt. The range of feelings and attitudes, as well as the resulting tensions, is described below in the context of the various groups that have expressed an interest in the hunt.

3.8.2 Regulatory Overview

No specific regulations directly address social tensions in the project area.

3.8.3 Existing Conditions

3.8.3.1 Makah Tribal Members

The Makah Tribe values whales for their ceremonial and subsistence uses, including the spiritual role they play in their culture. According to the *Application for a Waiver of the Marine Mammal Protection Act Take Moratorium to Exercise Gray Whale Hunting Rights Secured in the Treaty of Neah Bay*, the Makah have attempted to revive its cultural traditions for the past three decades (Makah Tribe 2005a). The Tribe believes it must revive these traditions to combat the social disruption resulting from the rapid changes of the last century and a half. The document states that rates of teenage pregnancy, high-school dropout, substance abuse, and juvenile crime indicate that the Makah community is still in flux and that the enormous social disruption caused by epidemics, boarding schools, and federal acculturation policy still exists. To reverse these trends, the Makah have reinstituted numerous song, dance, and artistic traditions. The Tribe currently operates a program to restore the Makah language to spoken proficiency on the reservation. Given the centrality of whaling to the Tribe's culture, the Makah believe that a revival of subsistence whaling is necessary to pursue its spiritual renaissance (Makah Tribe 2005a).

In preparation for the 1999 whale hunt, tribal participants engaged in both spiritual and physical training for the hunt. Overall, Makah tribal members experienced an increase in tribal pride (Bowechop 2004). This revival of Makah whaling rituals and traditional knowledge occurred after a 70-year hiatus (Section 3.10, Ceremonial and Subsistence Resources). Hunters reported that the activities accompanying the hunt strengthened tribal member identity as descendants of Makah whalers (Tweedie 2002). One of the elders who grew up speaking Makah reported that Makah language class attendance swelled after the hunt (Oldham 2003). Many community members were present when the first whale was landed at Neah Bay in 1999, and 80 percent attended the tribal celebration of the first whale hunt (Makah Tribe 2005a). Most Makah felt that the restoration of whaling had improved social and cultural conditions on the reservation. Subsistence whaling, both in the historic and contemporary contexts of the Makah culture, is further discussed in Section 3.10.3.4, Makah Historic Whaling, and Section 3.10.3.5, Contemporary Makah Society, respectively.

Although most Makah Tribe members support the hunt, some do not. According to a 2001/2002 household whaling survey the Makah Tribe conducted, 93 percent responded that the Makah Tribe should continue to hunt whales, 6 percent responded that the Tribe should not hunt whales, and 1 percent was undecided (Renker 2002; Renker 2007). This survey is described further in Section 3.10, Ceremonial and Subsistence Resources. One Makah Tribe member has publicly opposed the hunt, and spoke at the 1996 annual IWC meeting. She reported encountering harassment and hostility from pro-whaling tribal members (Mapes 1998b). According to newspaper account, other members who did not approve of the hunt were less vocal about their dissent (Mapes 1998c). The article indicated that those who spoke out were criticized for disloyalty to their leaders and for exposing tribal dissention to the outside world. According to Keith Hunter, a Neah Bay resident who is not a Makah tribal member, there has been no opposition to whaling of the sort portrayed by many of the anti-whaling advocates (CERTAIN 2000). Hunter claimed that disagreements, concerns, or differences almost entirely healed, and those remaining disappeared on the day the Makah took the whale.

Many people beyond the reservation do not support whaling, and protests were common during the hunting periods. See Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007, and Section 3.15.3.4, Behavior of People Associated with the Hunt, for a more complete description of protest activities. Makah Tribe members have expressed frustration with protesters and others who oppose the whale hunt. They believe that protesters, like missionaries and government Indian agents preceding them, are pushing their cultural values on the Makah people and telling them how and how not to be Makah (Johnson 1999).

The Makah Tribal Council provided financial support to both the whaling captain and whaling crew as they were training for the hunts in 1998 and hunting in 1999 and 2000. In 2002, the Council decided not to provide financial support, leaving it up to whaling families to support any hunts, consistent with tribal tradition. In 2002, at least three families were interested in a hunt, and two were actively training (Mapes 2002). The Makah Tribal Council has not indicated whether it would financially support future hunts if they were authorized.

3.8.3.2 Other Tribes

Many other tribes supported, and continue to support, the Makah's right to hunt whales, in part because they want the federal government to uphold treaty rights. In 1999, the *Peninsula Daily News* reported that thousands of Native Americans from Canada to New Mexico anticipated journeying to Neah Bay for a feast to celebrate the successful hunt (*Peninsula Daily News*, the Associated Press, and *Seattle Times* 1999). The hunt was supported by the Northwest Indian Fisheries Commission, an organization of 20 member tribes in western Washington; the president of the Northwest Indian Fisheries Commission gave a speech at the celebratory feast after the whale was killed (Bowechop 2004). In 2003, the Affiliated Tribes of Northwest Indians passed Resolution 03-13 in support of the Makah whaling treaty rights. In 2004, the National Congress of American Indians passed Resolution MOH-04-025, stating the following:

> . . . go on the record in full support of the right of the Makah to freely exercise their treaty right to hunt whales while supporting the rights of Fishing Tribes to marine mammal management without threats, intimidation, harassment, or interference.

The National Congress of American Indians also expressed support for the Makah after the *Anderson v. Evans* (2004) decision. It called upon the United States government and all of its agencies to "support the efforts of the Makah Tribe and affected tribes to restore its full treaty whaling rights." In a 2005 scoping letter on the DEIS, Honor Our Neighbor's Origins and Rights registered its support of the treaty-protected right of the Makah to pursue whaling. A Puyallup Tribe member supported this idea in an interview with the *Seattle Times* by noting the importance of Makah whaling in the context of tribal rights. He mentioned the importance of solidarity, saying "One of the ways we were conquered was by dividing us" (Hamilton 1999a). Some individual Native American commenters for this DEIS did express opposition to the hunt; a summary of the views of these and other individuals is encapsulated below in Section 3.8.3.3, Other Individuals and Organizations.

Immediately after the successful 1999 whale hunt, anti-whaling activists targeted the Muckleshoot, Puyallup, and Tulalip Tribes for their support of the Makah's whale hunt (Burkitt 1999a). The tribes received verbal threats and insults, including a bomb threat to a tribal school (Burkitt 1999a).

3.8.3.3 Other Individuals and Organizations

This section covers the range of attitudes about Makah whale hunting held by Clallam County residents, Washington State residents, United States residents, foreign nationals, and people affiliated with organizations. Both local and out-of-state residents have expressed support for and opposition to the Makah whale hunt. This section also covers the attitudes of potential tourists who may or may not choose to visit the area due to their perceptions of the whale hunt.

Although the debate can often be characterized as polar extremes of whaling proponents and whaling opponents, the complicated views cannot be reduced to two simple perspectives (Sepez 2002). Some people believe, for instance, that all whaling, including commercial whaling, is acceptable as long as the whale resource remains at a sustainable level based on scientific, principled management. Some people believe that commercial whaling is unacceptable, but that subsistence whaling for aboriginal cultures is acceptable. Some people believe that whaling for any purpose is unacceptable and should not be allowed. The debate about how to manage whales is about culturally based values (Freeman 1994).

Specific to the Makah's past and proposed whale hunting activities, NMFS has received public comments on the 1997 EA, the 2001 EA, and this DEIS. The commenters can be divided into those who support the Makah's hunting of gray whales and those who oppose any hunting of gray whales. The commenters are not necessarily divided along cultural lines (people from indigenous cultures versus people from western societies). Some Native American commenters and individual Makah Tribe members interviewed in the past and while preparing this DEIS analysis disagree with the hunt. Some commenters who did not identify themselves as Native Americans support the hunt. Commenters who have supported or would support the Makah hunt give many reasons for their support, including, but not limited to, their perception of the established treaty whaling right of the Makah Tribe and federal obligations to the Makah Tribe (Section 1.2.2, Treaty of Neah Bay and the Federal Trust Responsibility), the relative health of the gray whale population (Section 3.4.3.4, Current Status of the Gray Whale Population), and the historical and contemporary cultural meaning ascribed to whaling by the Makah (Section 3.10, Ceremonial and Subsistence Resources).

Commenters who did not or would not support the Makah's hunt of gray whales also gave a multitude of reasons, some of them related to social and economic values attributed to the gray whales. Several people, for instance, commented on the beauty of the whales and the emotions they inspire. Many people oppose the killing of whales because they believe whales are intelligent (comparable in this regard to humans) and have sophisticated forms of community and communication. One review states, "stranger than fiction is fact that there already exists a species of animal life on earth that scientists speculate has higher than human intelligence. The whale has a brain that in some instances is six times bigger than the human brain and its neocortex is more convoluted" (D'Amato and Chopra 1991). In a letter to the *Seattle Post-Intelligencer* editor, one person wrote ". . . I believe whales and other marine mammals are intelligent, and for lack of opposable thumbs, might be creatures equal to humans on the evolutionary ladder" (*Seattle Post-Intelligencer* 1999). In addition, human-like characteristics of whales, such as humpback whales' complicated communication system, and the strong family grouping of orcas, particularly endear whales to people (Sepez 2002). Some people also believe that whales are sentient beings that should be allowed to exist free from human harm.

People both inside and outside of the United States have said that they value the existence of gray whales in the project area as fellow mammals, and they want to know that whales exist unmolested. Many people (mostly local residents) who watch whales in the action area on a regular basis attach existence values to individual whales that have been identified through photo-identification studies. Many people were also concerned about the pain individual whales experience if struck or killed in a hunt. Some people believe that cruelty is necessarily involved in methods used to hunt whales (Freeman 1994).

After the 1999 hunt, many people expressed remorse and anger about the whale hunt in protests in Seattle and Port Angeles in letters and calls to local and regional newspapers such as the *Peninsula Daily News*, the *Seattle Times*, and the *Seattle Post-Intelligencer*. The *Seattle Times* reported that they received almost 400 phone calls and emails running about 10-to-1 against the hunt within hours of the Makah Tribe's successful kill of a gray whale (*Seattle Times* staff 1999). Many people's comments were reactions to the images of the killing of the whale on the morning television news. Some thought the coverage of the killing was inappropriate for television news (Levesque 1999). Some protesters and comment writers expressed violent feelings and displayed racism towards the Makah.

Some DEIS scoping comments suggested that people would boycott products and not participate in tourism on the peninsula and throughout the state as a result of whaling. They were concerned that whaling would cause economic impacts on hotels, restaurants, stores, and tourist-related businesses. Some people opposed using modern technology for the hunt, suggesting that a traditional hunt should be conducted using traditional technology (Section 2.4.5.1, Hunt Using Only Traditional Methods). Although most letters and calls received by newspapers after the successful 1999 whale hunt opposed the whale hunt, many commenters expressed support for the Tribe and the hunt. One letter said, "It is the right of the Makah to keep their culture alive and if whale hunting is part of it, so be it!" (*Peninsula Daily News* 1999). Some

DEIS scoping letters also expressed support for the hunt, remarking on tourist interest in whaling, cultural diversity, and the importance of upholding treaty rights. One scoping comment indicated that the Pacific Northwest embraces all cultures and practices and that people come to the area because of this diversity.

Organizations that oppose whaling in general include animal-rights and marine conservation organizations, the whale-watching industry, and anti-treaty constituents. Some of these groups are opposed to the Makah whale hunt, while others think that aboriginal whaling is an acceptable form of whaling, if conducted in a sustainable manner. More than 350 groups from 27 countries have expressed opposition to the Tribe's whale hunt (Oldham 2003).

In the 1970s, the popular Save the Whales conservation movement began with the objective of preventing the extinction of whale species (Sepez 2002). Information about whales and whaling was advertised by media releases, films, television programs, aquarium shows, videos, books, magazines, paintings, and whale-watching businesses, among other things (Barstow 1996; Sepez 2002). Over time, stemming from the unsustainable commercial whaling practices in the past, an ideological debate has emerged concerning the appropriateness of any whale hunting (Freeman 1994; Stoett 1997). Whales have become symbolic of the need to protect the natural environment, at least in western societies (Barstow 1996; Stoett 1997).

In 2002, after the IWC renewed the gray whale catch limits, some anti-whaling groups announced they would not obstruct the Makah hunt directly (Watson 2002), and one group expressed concern that opposition to the hunt might be misinterpreted as opposition to treaty rights (Mapes 2002). Most whale-watching tour operators are opposed to whale hunting primarily due to economic reasons. Some scoping comments expressed concerns that a gray whale hunt would affect local and regional whale-watching industry revenues by causing whales to avoid boats. The West Coast Anti-Whaling Society, made up of professional whale-watching tour guides, is one group that has opposed Makah whaling (Hamilton 1999b). More information on the whale-watching industry is available in Section 3.6.3.2.4, Contribution of Tourism to the Local Economy.

While Clallam County residents have expressed the range of attitudes about Makah whale hunting described above, a more intense debate about the issue seems to be occurring in and near Clallam County due to proximity to Neah Bay. This intense debate, which includes strong disapproval of and support for the hunt, is evident in the many DEIS scoping letters sent by Clallam County residents, verbal scoping comments recorded at the Port Angeles DEIS scoping meeting, letters and calls from Clallam County residents received after the successful 1999 whale hunt, and whaling protests in Port Angeles. Of those Clallam County residents who expressed a view during scoping, more expressed disapproval of than support for the hunt.

A local group called Peninsula Citizens for the Protection of Whales actively opposes the hunt. The group's scoping letter expresses the fear that continued whaling will divide the community, and the many tribes in the area will be drawn into the controversy. Members of the group protested near the Makah reservation border in the spring of 1999 (Porterfield 1999). Another local group, Washington Citizens Coastal Alliance, based in nearby Friday Harbor, sent out a travel advisory to several hundred travel organizations, media groups, and individuals, expressing opposition to whaling (Hamilton 1999b). The advisory warned potential tourists to Neah Bay of recent conflicts and violence stemming from the whaling issue. The *Seattle Times* reported that other activists have said that the controversy was ripping apart rural Clallam County and Washington as a whole (Welch 2001).

Several incidents involving violent or near-violent confrontations between whaling opponents and Tribe members have occurred in Clallam County since the Tribe first announced its intention to hunt whales in 1995. It is difficult to determine which protesters are local residents and which are representatives of anti-whaling organizations based outside the area. An anti-whaling activist meeting in Port Angeles in 1998 was the scene of a near-riot when Makah Tribe members showed up uninvited to support whaling (Peterson 2000). One incident in 1999 involved two animal-rights activists tossing ignited smoke canisters at a tribal motorized support boat and throwing an ignited flare into the water near the boat (Porterfield 1999). Another incident involved a protest boat being pelted with rocks and bottle rockets after a group of protest boats converged inside the Neah Bay Marina (Gottlieb 1999). One man burned the American flag and some tires in a Port Angeles park in protest of the whale hunt (Gottlieb 1999). After the successful 1999 whale hunt, Tribe members and the Coast Guard received emails and phone calls with death threats and anti-whaling messages (Hamilton 1999c). Some Tribe members have been refused service at businesses in Port Angeles (Hamilton 1999c). See Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007, and Section 3.15.3.4, Behavior of People Associated with the Hunt, for a more complete description of protest activities.

Other evidence of heightened local tensions can be found in a 2001 letter from the Port Angeles Chief of Police and Clallam County Sheriff to NMFS, asking NMFS not to hold public hearings on the whaling issue in Port Angeles for the 2001 EA. The request was made due to concerns that violent demonstrations would overwhelm the resources of local law enforcement (Port Angeles Police Department 2001).

3.9 Cultural Resources

3.9.1 Introduction

The following section discusses the cultural resources in the project area that may be affected by the proposed action.

3.9.2 Regulatory Overview

Federal and state laws protect and preserve cultural resources. The United States' first preservation law, the Antiquities Act of 1906, was updated and expanded in 1966 when Congress enacted the National Historic Preservation Act, declaring that "the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people." Thus, the National Historic Preservation Act established a national historic preservation program that has operated as a decentralized partnership between the federal government and the states. The National Historic Preservation Act, amended in 1980 and again in 1992 (16 USC 470 et seq.), identified a leadership role for the federal government in historic preservation. Through a partnership with the states, in addition to relationships with Indian tribes, local governments, and private organizations, the National Historic Preservation Act fosters conditions "under which our modern society and our prehistoric and historic resources can exist in productive harmony." These relationships provide broad participation in national historic preservation programs, while maintaining standards consistent with the National Historic Preservation Act and the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716, September 29, 1983).

Federal agency requirements to consult with Indian tribes are clarified in the Advisory Council on Historic Preservation's regulations, Protection of Historic Properties (36 CFR Part 800), implementing Section 106 of the National Historic Preservation Act. These regulations emphasize participation in this process by state historic preservation officers and the public, including Native American groups. Where the pertinent tribe has taken over all or some functions of the state historic preservation officers, as the Makah Tribe has done, the federal agency must consult with the tribal historic preservation officer for projects occurring on Indian reservations or potentially affecting a tribe's off-reservation traditional cultural properties.

Archaeological resources on federal lands received federal protection under the 1979 Archaeological Resources Protection Act and the 1990 Native American Graves Protection and Repatriation Act. Federal law applies to all federal and Native American lands, and Washington State law applies to all other lands. Washington State Executive Order 05-05 provides for the Department of Archaeology and Historic Preservation to review certain projects not undergoing Section 106 review to determine potential impacts to cultural resources. With respect to cultural resources within the Makah Tribe's traditional territory, the Tribe takes an active role in the documentation and preservation of these resources, including the assessment of potential impacts to its cultural resources.

3.9.3 Existing Conditions

3.9.3.1 National Historical Register Sites

There are three historic sites listed on the National Register of Historic Places near the project area where a whale could be landed (i.e., the Makah U&A waters and shoreline). The first is Quimper's Landing at Neah Bay, which is the site where the Spanish anchored in Neah Bay and laid claim to Cape Flattery in 1790. The anchorage site is in the northeast waters/shore of Neah Bay near Waadah Island. The second is Tatoosh Island, which was a summer home to the Makah Tribe. The Makah landed whales on Tatoosh Island. A lighthouse was erected there in 1857. The third listed site is Wedding Rock Petroglyphs, located on the beach between the Ozette and Sand Point Trails in the coastal strip of the Olympic National Park (i.e., Ozette Triangle). The Wedding Rock Petroglyphs are located in the rocks about the high tide line, and they attract many visitors each year.

3.9.3.2 Archaeological Sites

Around 1750, a substantial section of the Ozette village on the outer coast of the Olympic Peninsula was encased in a spring mudslide. This anaerobic environment preserved wood, bone, textile, and cordage to create unprecedented archaeological preservation. More than a decade of archaeological excavations at this site, beginning around 1970, yielded 55,000 artifacts, 12,000 structural remains, and more than 1 million faunal remains. These archaeological investigations revealed about 2000 years of human occupation along the Olympic Peninsula in the Late Period of the Northwest Coast (Wessen 1981).

3.9.3.3 Other Culturally Important Sites

Of particular assistance in determining the presence and location of traditional cultural properties was the "Makah Traditional Cultural Property Study," prepared for the Office of Archaeology and Historic Preservation, State of Washington, Olympia, in cooperation with the Makah Cultural and Research Center, Neah Bay (Renker and Pascua 1989). That study recognized the entire Makah traditional territory as a traditional cultural property. For the purposes of the EIS, however, the definition of a traditional cultural property was narrowed to include only those sites known to be directly associated with whaling for which the location has been reported. Makah elders identified First Beach, situated immediately adjacent to Neah Bay, as a site associated with butchering whales. A review of the ethnographic literature did not locate other sites that would meet the criterion of a traditional cultural property for this EIS.

First Beach, situated next to Neah Bay, was where the chief of the Neah Bay village towed his whale for flensing. It was known in the Makah language as *č̓i·ʔawa·ʔiyak*, “place for butchering whales.” Renker and Pascua (1989, no. 190) listed this site as a traditional cultural property retaining significance to the Makah Tribe. Other chiefs towed harvested whales to beaches closer to their villages.

There are several, unlisted shell midden sites in the Olympic National Park, and these are actively exposed along eroding beach terraces. There are also unlisted whaling sacred sites, where Makah Tribe whaling families and members would prepare for whaling. The locations of such sites are regarded as private knowledge that is not generally divulged to non-family members. There are no specific known locations that the Tribe uses continually and that could be considered historical sites.

3.10 Ceremonial and Subsistence Resources

3.10.1 Introduction

The following section presents the cultural aspects of the Makah Tribe’s proposal to hunt gray whales for subsistence and ceremonial purposes (Section 3.16, Human Health, for further information about the nutritional aspect of subsistence and ceremonial hunting). This section also includes a discussion of the symbolic value of the whale to the Makah people’s cultural identity.

3.10.2 Regulatory Overview

The American Indian Religious Freedom Act of 1978 (42 USC 1996) contains the following language:

> . . . it shall be the policy of the United States to protect and preserve for American Indians . . . their inherent right of freedom to believe, express and exercise [their] traditional religions,. . . including but not limited to access to sites, use and possession of sacred objects and the freedom to worship through ceremonials and traditional rites.

Additionally, the Religious Freedom Restoration Act of 1993 (42 USC 2000b) provides protections for religious practice. The statute places the initial burden on a person to establish that religious practices have been substantially burdened. The Makah have asserted that the spiritual and ceremonial practices associated with whaling are protected by these two statutes (Makah Tribe 2006b).

In the Treaty of Neah Bay, the Makah Indian Tribe reserved its right to engage in subsistence activities, including hunting, fishing, whaling, and sealing in its usual and accustomed grounds (Section 1.2.2, Treaty of Neah Bay and the Federal Trust Responsibility). In the Ninth Circuit decision in *Anderson v. Evans*, the Court of Appeals expressly stated that ". . . [w]e need not and do not decide whether the Tribe's whaling rights have been abrogated by the MMPA." The court also noted that ". . . [u]nlike other persons applying for a permit or waiver under the MMPA, the Tribe may urge a treaty right to be considered" during review of the Makah Tribe's request (*Anderson v. Evans* 2004).

3.10.3 Existing Conditions

The Makah call themselves *qwidiččaʔatx̣,* which is generally thought to mean "residents of the place of rocks and seagulls." They are, however, best known by the anglicized term *máq̓áʔa*, which is used by their Klallam neighbors to refer to the Makah Tribe. The Makah Tribe continue to reside on lands within their traditional territory situated on the northwest tip of the Olympic Peninsula, bordered by the Strait of Juan de Fuca and the Pacific Ocean. Tribe members maintain a strong orientation to the sea and the resources it provides.

Both linguistically and culturally, the aboriginal Makah people were closest to the Ditidaht and Nuu-chah-nulth peoples of western Vancouver Island, with whom they shared the occupation of whaling. While ties to these Canadian neighbors continue, the people of the contemporary Makah Tribe participate with other western Washington tribes as members of the Northwest Indian Fisheries Commission, whose mission is the conservation of fisheries dependent upon effective and progressive management (Northwest Indian Fisheries Commission 2005).

3.10.3.1 Makah Archaeological Resources Connected with Whaling

Much of the archaeological and historical evidence of the Makah whaling tradition was obtained through a large excavation of a Makah whaling village (Ozette) that was occupied by the Makah Tribe from 400 B.C. to 1920. Around 1750, a substantial section of the Ozette village on the outer coast of the Olympic Peninsula was encased in a spring mudslide. This anaerobic environment preserved wood, bone, textile, and cordage to create an unprecedented archaeological preservation. More than a decade of archaeological excavations at this site, beginning around 1970, yielded 55,000 artifacts, 12,000 structural remains, and more than one million faunal remains. These archaeological investigations revealed about 2000 years of human occupation along the Olympic Peninsula in the Late Period of the Northwest Coast (Wessen 1981).

Aboriginal people began moving from interior riverine sites to the bays along the Pacific Ocean around 400 B.C., where they then adapted to a maritime orientation. This adaptation brought about an increase in sea mammal hunting, including whaling, which, along with deep sea fishing, necessitated the development of the large, seagoing canoes described ethnographically by Waterman (1920). An archaeological walking survey of Makah territory, complemented with test excavations at six additional sites representing divergent environmental zones, indicated that all of the investigated sites shared an orientation towards sea mammal hunting that was seen most clearly at Ozette (Friedman 1976:204).

Based on the recovery of whaling equipment and whale bones with embedded fragments of harpoon blades at the Ozette excavation, archaeologists determined that, for at least 1,500 years, the Makah Tribe paddled out to sea to hunt whales. Earlier, as evidenced by butchered whale bone in archaeological deposits, the Makah Tribe harvested drift and stranded whales (Huelsbeck 1994). The skeletal remains of the gray whale and humpback whale were both equally represented and the dominant whale species recorded in the deposits where the whale species could be identified, suggesting that they were actively pursued by Makah hunters. Moreover, the number of whale bones recovered from different areas of the site representing different time periods did not vary, suggesting that whaling remained stable. Artifacts recovered archaeologically indicate that whaling techniques described ethnographically by Drucker (1951) were used prehistorically (Huelsbeck 1994). Canoe fragments, harpoon shafts, harpoon heads, sinew ropes, and wooden plugs from seal skin floats have all been found (Huelsbeck 1994).

Most of the excavated bones identified as whale could not, however, be identified by species due to limitations of the comparative material available (Huelsbeck 1994). From the skeletal material that could be identified, nevertheless, archaeologists concluded that, at Ozette, whales represented much more food than all the other kinds of animals combined (Huelsbeck 1994). Researchers estimated that as much as 85 percent of the pre-contact diet of the Makah Tribe, that is, their diet before the first arrival of Europeans in the late 18th century, could have been composed of whale meat, oil, and blubber (Huelsbeck 1988). Archaeological evidence in the form of roughly cut and gouged bones suggests that the Makah, in addition to rendering blubber for oil, extracted oil from bones, a practice not reported ethnographically (that is, through interviews with Makah elders) or through observation of their practices. In addition, partially burned bone suggested roasting as a method of cooking the meat (Huelsbeck 1994). Fragments of whale skin were also found inside the remains of houses at Ozette, a finding consistent with Koppert's (1930) remark that whale skin was eaten. While Koppert (1930) thought that the entire whale was used, other reports differed on the extent of carcass used and/or consumed by the Makah (Waterman 1920).

3.10.3.2 Makah Cultural Environment

At the time of the treaty, the Makah Tribe permanently occupied five villages situated on the northwestern tip of the Olympic Peninsula before contact with Europeans: *di·ya·* or Neah Bay; *bi?id?a* or Biheda; *wa?ač̓* or Wayatch; *c̓u·yas* or Tsoo-Yess; and *?use·?ił* or Ozette. In addition to these five semiautonomous winter villages, Makah families occupied seasonal sites, such as fishing camps on the outer coast (Friedman 1976; Renker and Gunther 1990).

Anthropologists classify the Makah Tribe within the Nootkan (Nuu-chah-nulth) subdivision of the Northwest Coast Cultural Area, a cluster of societies that share certain traits and trait complexes. Drucker (1951) defines these traits:

- A marine and riverine orientation that permeated not only subsistence practices but ideology and outlook
- An emphasis on fishing and marine mammal hunting, as well as the gathering of shellfish, other marine invertebrates, and plants
- A highly developed woodworking technology
- A tripartite system of social stratification that included nobles, commoners, and slaves
- An emphasis on property, both tangible and noncorporeal
- The integration of rank and kinship as the basis for social interaction

The Makah Tribe's location and wealth in natural resources placed tribal members at the hub of a far-reaching trading network that extended north to Vancouver Island, south to the Lower Columbia River, and east to the tribes of the Strait of Juan de Fuca. Whale oil and other coastal products passed along this network (Swan 1870; Renker and Gunther 1990).

3.10.3.3 Historic Makah Community

The Makah winter village comprised the primary residential community. The people lived in large, shed-roofed, cedar plank dwellings during the rainy winter months when resource harvesting activities were at a low ebb, and ceremonial life was more active. People identified themselves primarily with their winter village, but individuals maintained kinship ties with several villages, not all of them Makahs. Kin units among the Makah were organized on the basis of non-unilinear descent, meaning that members all acknowledge descent from a common ancestor traced through either males or females. Leadership tended to be controlled by a patrilineal core of elite residents, generally consisting of a father and his sons with their families, resulting in households being quasi-lineages that controlled production, consumption, and resources. Hence, these elite groups of kinsmen were the chiefs who owned the resources and organized the work of others for resource harvest and distribution.

The elite members of Makah society were the titleholders, the chiefs or nobles who held rights to inherited leadership positions. Despite their considerable prestige and ritual authority, however, they held limited political power. Chiefs had influence, but could seldom compel other individuals to act against their will. Commoners and slaves formed the lower two strata of society. The former enjoyed the privileges of membership in their descent group and had access to resources and ceremonial prerogatives, although commoners did not have rights to ranked titles. Slaves, however, obtained through capture or purchase from other tribes, were human property devoid of rights (Drucker 1951; Colson 1953; Renker and Gunther 1990). Such distinctions in rank and status declined following guidelines set forth in the Makah Tribe's 1855 treaty and the establishment of the Neah Bay Indian Agency in 1863. Under the influence of Indian agents who promoted assimilation, the Makah Tribe's pre-contact, visible sociopolitical organization was weakened. In 1879, the community of Neah Bay held its first election for headmen, the result of which was recorded by James Swan, who noted that similar proceedings were soon to be held at the other Makah villages (Goodman and Swan 2003).

3.10.3.4 Makah Historic Whaling

At least seven species of whale are distinguished in the dialects of the Makah Tribe and their Nuu-chah-nulth neighbors (Swan 1870; Sapir 1910 to 1914; Waterman 1920; Densmore 1939; Stonham 2005). From review of the ethnographic record, especially the work of Drucker (1951), whales, from the perspective of the Makah Tribe and neighboring aboriginal groups on the Northwest Coast, differed little from humans: both have human form, live in houses (although the whale's home is at the bottom of the ocean), and travel about in canoes. The aboriginal people believed that the familiar bulbous gray form observed as whale, gray or humpback, was merely a whale spirit riding in its canoe while fishing (Sapir 1910 to 1914). By means of the whaler's ritual supplications, the whale's spirit was enticed to leave its canoe, which allowed the whale's body to be caught (Jonaitis 1999).

Ethnographic reports indicate that Makah Tribe hunters pursued mostly gray whales and humpbacks (Waterman 1920; Drucker 1951), while skeletal remains in archaeological sites suggest that right whales and finbacks may have been taken occasionally, and sperm and orca whale remains probably represent salvaged drift whales (Huelsbeck 1988). The unifying characteristic of those whale species the Makah pursued was a slow swimming speed, enabling their capture by men in canoes. The hunting season for gray whales began in March, when they appeared in numbers off Tatoosh Island on their coastal migration north, and resumed in November during their migration south. Pods of humpback and grays may have remained in the area all summer (Huelsbeck 1994), permitting whale hunting to occur from early spring through the fall.

The killing of whales was the prerogative of titled men among the Makah Tribe (Swan 1870), due largely to the necessary elaborate rituals associated with whale hunting, the cost of outfitting an expedition, and the authority needed to assemble a crew (Drucker 1955). The success of the hunt relied upon the whalers' strict observance of ritual knowledge, which only the elite possessed and which the Makah Tribe believed to be the essential basis of a whaler. Knowledge of and adherence to the rites, along with spiritual assistance received through prayer to the ancestors, was reflected in a chief's wealth. Thus, in Makah theory, the rituals were responsible for one having wealth, and wealth demonstrated the presence and efficacy of a man's spiritual power. Wealthy men married the daughters of powerful chiefs, perpetuating the presence of an elite class and, by selecting spouses from other communities, creating a social and economic network through which wealth, people, and information passed. Drucker (1951) describes the Nuu-chah-nulth groom's harpooning of the door of the bride's house during the marriage ceremony, using an imitation whaling harpoon, complete with floats. The association of whaling with wealth and rank was also evident during marriage ceremonies such as one witnessed at Neah Bay in the 1850s, when the groom's party reenacted a whale hunt upon arrival (Hancock 1927).

In preparation for hunting, Makah whalers trained themselves to acquire spiritual strength and power so that the whale could be killed more easily. Training consisted of ritual bathing, praying, rubbing the skin with boughs or nettles, and imitative performances. Such practices took place at selected, secret locations that were regarded as spiritually powerful places, some of which included elaborate shrines adorned with carved figures and human skulls said to represent the whaler's ancestors (Waterman 1920; Gunther 1942; Drucker 1951; Jonaitis 1999). Each family or extended family had its own secret spot, usually no larger than a room, but kept private from all other families. Even the details of the bather's costume, the prayers, and the type of branches the whaler used were private knowledge that was passed from one generation to the next according to the rules of inheritance. The absence of centralized dogmatic control of spiritual and ritual practices was characteristic of Makah society. Thus, the practices described in this document and recorded by anthropologists and other early observers as Makah may have been the practices of a particular extended family group, but ritual practice varied from family to family. The widow of one Makah whaler recalled how her husband visited a specific place immediately before the hunt in the early 1940s, and his training continued throughout the whaling season to be ready whenever whales were sighted (Gunther 1942). In one hunting strategy, lookouts were stationed at coastal high points to alert hunters of the presence of a whale.

Chiefs had two methods of obtaining whales: either hunting them from a canoe on the open water and harpooning them, or using ritual to entice them to die and float ashore. A focus of the whaler's ritual activity at his shrine was to entice the whale to relinquish its spirit and allow its body to drift ashore, thereby permitting the chief to avoid the dangers of hunting at sea (Drucker 1951; Jonaitis 1999).

The whale had a special relationship to the noblewomen and, during the hunt, the whaler's wife would act as if she had become the whale. Her movements would determine the behavior of the whale—if she moved about too much, the whale her husband was hunting would be equally active and difficult to spear; if she lay quietly, the whale would give itself to her husband. Towing chants often reflected this association, and the whalers addressed the dead carcass using a term that refers to a chief's wife. His wife greeted the whale when the hunters towed the carcass to shore, and she led the procession to the chief's house (Drucker 1951). This transformation that occurs during the ritual, i.e., noblewoman becoming a whale, has an empirical connection, as the presence of the whale in the village validates the chief's spiritual power, authority, and wealth, including his bond to noblewomen who are themselves descendants of great whalers (Gunther 1942; Drucker 1951; Renker 2002).

Hunting crews were led by the titled nobleman who owned the 30-foot cedar canoe and its specialized equipment and acted as harpooner. There were typically seven other crew members, including a steersman and six paddlers, one of whom was also a diver who fastened shut the whale's mouth after it had been killed. Each of the eight-man crew was physically fit and either possessed hereditary access to the position and its complementary ritual knowledge, or obtained such knowledge through a supernatural encounter (Curtis 1916; Waterman 1920). Each man dressed in special skin clothing adorned with feathers (Sapir 1910 to 1914). A number of canoes hunted together, each outfitted with harpoons, sealskin floats, harpoon lines of whale sinew and others of cedar, and a variety of knives (Waterman 1920). Several ethnographic reports containing information based on accounts from whalers have described the hunt (Curtis 1916; Drucker 1951). When a whale was sighted from shore, the Makah hunters set out in previously equipped canoes that were kept ready for use. Whales could often be observed close to Umatilla Reef and Swiftsure Bank, near the entrance to the Strait of Juan de Fuca, where the migrating whales would be feeding. A hunt could last for several days and take the hunters far out to sea, a journey that required considerable navigational skills (Waterman 1920).

Curtis' (1916) description of the hunt conveys some of the hunters' specialized knowledge and finely tuned skills that were the necessary complement to the rigorous spiritual training each hunter endured. Yet there was likely no skill more important than that of the chief who wielded the immense harpoon and, only several feet from the whale, thrust it into the flesh of the submerging prey, after the whale's flukes went underwater and could not upset the hunters' canoe. Once harpooned, the Makah hunters threw several other harpoons into the injured animal, until it was finally exhausted. Then the whale hunters began singing to the whale, imploring it to head shoreward as they started the arduous task of towing home their immense catch. When the hunters followed the prescribed rituals, the whale spirit left the body of its host, and the hunters successfully towed the whale to the chief's village for butchering. As they traveled, the hunters continued to sing chants encouraging the whale to move to shore (Curtis 1916; Waterman 1920; Drucker 1951).

First Beach, situated next to Neah Bay, was where the chief of the Neah Bay village towed his whale for flensing. It was known in the Makah language as *č̓i·ʔawa·ʔiyak*, "place for butchering whales." Renker and Pascua (1989, no. 190) listed this site as a traditional cultural property retaining significance to the Makah Tribe. Other chiefs towed harvested whales to beaches closer to their villages.

The villagers hauled the catch as high on the beach as possible. In some communities, all the village children helped pull the whale the last few yards (Drucker 1951). Butchering procedures depended on the species, but ritual and ceremony always accompanied the initial steps as an elderly whaler made the first cut into the whale, now decorated by the Makah with eagle feathers and white down taken from waterfowl, and the men began to strip away square slabs of the valuable blubber. The dorsal section, richest in oil, was reserved for the chief hunter, though he is reported often to have sold or given it away. Choice morsels were reserved for the hunters and for those leading men who had rights to particular pieces of the whale. The chief whaler, dressed in ceremonial gear, also entertained the villagers with his songs and imitations. He provided the villagers with freshly cooked blubber from his catch and distributed the remainder. The villagers, in turn, sang songs honoring the chief's and the whale's prowess and generosity. For as many as four nights, the chief led the community in ceremonial performances marked by imitations of the whale, the hunt, and songs that praised the whale. Individual whalers owned different songs (Waterman 1920; Swan 1870). Drucker (1951) noted that the Nuu-chah-nulth carried the concept of ownership to "an incredible extreme," with the result that all ceremonial privileges, such as the right to use certain songs and dances, perform certain rituals, or certain acts within them, were owned property.

The Makah probably regarded the whale as a guest in the village in the same way as the Nuu-chah-nulth of Vancouver Island. Thus, once the community had feasted, the hunters had to return the whale's spirit to the sea by casting small pieces of flesh and blubber into the ocean where it could not wash up on shore (Curtis 1916). The whale carcass was then left for the villagers to help themselves (Drucker 1951). This activity was shared by "the entire tribe, great and small, male and female," according to one observer in the 1850s (Hancock 1927), after which the birds and other scavengers picked at the remains on the beach (Waterman 1920). Thus, once the chief had directed the removal of all the blubber, to be eaten fresh or rendered into oil, the villagers took most of the flesh, also for consumption, in addition to the bones and baleen, as needed.

Drift whales ─ those whales that drifted to shore after death ─ were reported to the beach owner by messengers, who were paid for the find. The drift whales were examined to identify any signs of ownership, indicated by specific marks on any harpoon heads embedded in the whale's flesh, or on seal skin floats attached to the harpoon. Whales that had been identified as lost after being harpooned, or that had been cut free when bad weather threatened the hunters' return home, belonged to the hunter, unless another chief's mark was identified. The villagers would congregate on the beach to strip the whale's blubber for their respective chief, after which the people would help themselves to the meat and blubber, again leaving the carcass with most of the bones (Drucker 1951).

Meat that was decayed, which sometimes occurred with drift whales, or whales caught too far from shore on which the flesh began to rot, was left on the beach along with the bones. The villagers took the bones from the beach only when they could serve some purpose; thus, the skeleton with any remaining morsels of meat remained on the shore or was washed out to sea

(Waterman 1920; Drucker 1951). Blubber, however, seldom deteriorated to the extent that it could not be used, if only for technological purposes, and it was not consumed (Waterman 1920; Drucker 1951).

Whale products provided enough blubber and oil for the aboriginal village, as well as a surplus of oil to be traded with neighboring tribes (Lane 1972). An account of exchange included in the journal of John Jewitt, a crewman from an American vessel taken captive by the Nuu-chah-nulth chief Maquinna in 1803, noted that Maquinna's trade with neighboring tribes was "principally train oil," and from the Makah he received "great quantities of oil" and whale sinew (Jewitt 1993). The oil was stored in boxes specially made for the purpose or in bladders or stomachs of marine mammals and certain large fish (Curtis 1916). Whale oil was a standard condiment served with meals, typically used as a dip for dried foods such as salmon and berries (Drucker 1951). Whale oil was also thrown on central fires to fuel the blaze during rituals, and at least one visitor to the area in the mid-1800s observed shell lamps in which whale oil was burned (Drucker 1951). The Makah Tribe made offerings to the supernatural world by burning feathers and whale oil, an act accompanied by prayers from the head of the household (Curtis 1916). In the 1840s, Makah traders provided whale oil to the Hudson's Bay Company's Fort Victoria for shipment to England (e.g., Fort Victoria Journal, December 7, 1846). Additionally, Makah craftsmen used bones and baleen as raw material for tool manufacture and bones as building material (Huelsbeck 1994).

The ethnographic literature is inconsistent regarding the consumption of whale meat, the dark flesh found under the thick layer of blubber (Waterman 1920). Stories recorded by Edward Sapir in the early 1900s tell of Nuu-chah-nulth villagers boiling fresh whale meat, drinking the broth (Arima et al. 2000), and giving feasts of meat and blubber (Sapir 1910 to 1914). Drucker (1951) confirmed Curtis' (1916) earlier report that the whale flesh could be both sun and smoke dried, although statements by Drucker's Nuu-chah-nulth consultants indicate that the meat was dried in smaller quantities than the valuable blubber. So rich was the partly dried blubber that pieces of it were given to suckling newborns until the child's mother could produce enough milk, generally by boosting her own nutrition with extra servings of blubber (Curtis 1916). Swan (1870) reported that only the vertebrae and offal were left unused. Among the whale bone artifacts recovered from the Ozette site are spindle whorls, bark shedders and beaters, cutting boards, clubs, wedges, and tool handles (Huelsbeck 1994). Drucker (1951) also reported the historic use of whale bone for such implements.

Historical and ethnographic accounts provide only rough calculations of the numbers of whales taken annually. The catch of 15.99 and 36.9 tons of blubber was reported and likely a similar amount of meat, depending upon whether the whales were Pacific grays or humpbacks, respectively (Huelsbeck 1988). Another source, writing specifically of the Makah Tribe, estimated that an average whaler might take one or two whales a year, but that a skilled and fortunate hunter might catch as many as five in the same period (Densmore 1939). This is a higher estimate than the numbers harvested between 1889 and 1892 when the entire Makah Tribe (including all whalers) averaged 5.5 whales a year (Huelsbeck 1988).

Reassessments of the role of whaling in aboriginal society indicate that whaling had great economic and social significance (Huelsbeck 1994; Renker 2002) and was not simply a "symbol of chieftains' greatness," with "little economic importance," as anthropologist Philip Drucker (1951) once described whale hunting, in light of the few whales caught by Nuu-chah-nulth men he interviewed in the mid-1930s. Ceremonies, music, and dance associated with this occupation, based on chiefly ownership and rank, held a central role in the maintenance of the Makah social system. A titled family maintained its standing by hosting ceremonies, particularly intervillage potlatches, performing hereditary songs, displaying owned prerogatives, and giving away food and gifts, all of which required great wealth. Even before a successful hunt, whaling chiefs held potlatches at which they made gifts of sticks said to represent strips of blubber to be given at a later date (Drucker 1951). The hereditary privileges owned by whalers and displayed at significant events were games and songs associated with the whale (Goodman and Swan 2003), among them a performance in which the dancers wore gear and imitated the motions of a whale (Densmore 1939).

3.10.3.4.1 <u>Cessation of the Hunt</u>

Historical and ethnographic records indicate that the Makah Tribe hunted whales until the 1920s when this practice went into abeyance. However, this period represented the conclusion of a gradual decline in whale hunting that had taken place since the 1855 Treaty, when 30 Makah canoes hunted together, and each canoe was said to have processed 1,000 gallons of oil (Swan in McDonald 1972). Swan (1870) noted that, even in the 1850s, the Makah Tribe was whaling less than in the past, but he could provide no clear explanation for the decline.

An account of one of the last Makah Tribe whale hunts was reported to the Victoria Colonist in 1905, largely due to the observer's fascination with the Makah Tribe's use of new technology for whaling. In that hunt, 60 Makah hunters in six large canoes stalked a whale. Once the main harpooner hit the prey, his fellow hunters thrust a large number of iron-tipped harpoons into the injured animal. A steam-powered commercial tow boat then pulled the whale into Neah Bay for butchering (cited in Webb 1988).

By 1916, Curtis (1916) observed that the Makah Tribe had recently revived the practice of whaling. It is clear, however, that the hunt had been untenable for a number of years and had ceased completely by the 1920s. By the time of the last Makah whale hunt, a constellation of factors ─ social, economic, and biological ─ had contributed to the Makah's cessation of the hunt until 1998 (see also Section 1.1.4, Summary of Makah Tribe's Historic Whaling Tradition). It was not the first time that the Makah Tribe interrupted a marine-based occupation, only to resume it when conditions improved. Makah witnesses appearing before the British Commissioners investigating the pelagic fur seal industry in the 1890s reported "for about twenty years the hunting was practically given up" because of the loss of lives at sea while hunting (cited in Crockford 1996). When conditions improved, the Makah Tribe resumed this activity in the early 1900s.

Recent research by Jennifer Sepez (2001) reveals that some Makah families continued to use whale meat and oil after the 1920s, when the hunt was discontinued. However, Sepez hypothesized that the likely source would have been from beached whales, whales caught in fishing nets, or possibly aboriginal whale hunts that continued to occur in Canada in the 1930s. At this time, British Columbia canneries sometimes processed whale meat obtained by aboriginal hunts (Webb 1988).

3.10.3.4.2 Factors Responsible for Discontinuation of the Hunt

Robert L. Webb's (1988) history of commercial whaling documents a steady decline in all species of whale that became the target of commercial whalers. Historical evidence indicates that the bay-whaling, which occurred in the lagoons of Mexico and Baja California in the 1840s, and the shore-based commercial whaling that began off the California coast in 1851 significantly reduced the once-healthy stocks of migrating ENP gray whales along the western coast of Washington. One observer estimated that, around the mid-1850s, 1,000 whales could be seen each day between December and February making their southern migration, suggesting to Scammon (1874) that whales migrating along the coast of California likely numbered about 30,000 a season. When Charles Scammon published his first edition of *The Marine Mammals of the North-Western Coast of North America* in 1874, only 20 years later, he estimated that the number of migrating gray whales did not exceed 10,000 whales.

With the development of the darting gun around 1870, which replaced the iron harpoon hurled by manual strength from the bow of a whaleboat, it became possible for commercial whalers to kill humpback whales (Webb 1988). This placed the industry in direct competition with the Makah Tribe, who hunted this species along with the gray whale.

The new whaling methods included steam-powered chaser boats on the sea and oil-fired steam rendering plants on shore, making easier, faster hunts possible and providing diverse new products from the raw materials. Although whale oil now competed with less costly petroleum products and vegetable and mineral oil, new ways of processing the oil kept it in demand and facilitated a renewed interest in whaling on the Northwest Coast in the early 1900s (Webb 1988). Humpback whales found in inlets and bays were hunted, along with blue and finback, and a new factory-ship technology permitted a resurgence of the gray whale hunt. Over a 10-year period, whale stocks dwindled. Thus, when the Makah Tribe and their Nuu-chah-nulth neighbors on Vancouver Island attempted to hunt whales in the early 1900s, few whales remained in the local waters (Webb 1988).

When World War I began, the government urged the public to consume whale meat without much success, as most Americans did not have a taste for the meat, although it appears that the Makah Tribe continued to enjoy it, and they consumed some whale meat processed by Canadian canneries (Goodman and Swan 2003). By the 1930s, with whale stocks almost entirely depleted, the whaling countries began to see the need to control the numbers of whales being taken. At a London conference in 1937, member countries adopted the International Agreement for the Regulation of Whaling, which applied stringent controls on the numbers and species of whales being killed. The gray whale became protected, along with right whales (except for a few taken by permit), by those countries participating in the agreement (Webb 1988). Commercial hunts depleted stocks of humpback whales as well, but international agreements did not protect this species until 1965 (Webb 1988).

Government policies, as Jennifer Sepez (2001) discussed in her doctoral thesis on the Makah Tribe's subsistence economy, affected both subsistence and commercial hunting efforts by regulating activities and creating incentives or disincentives. Historians and biologists agree that, other than regulations that protected the United States market for whale products, almost a century of commercial whaling occurred without regulation. This lack of regulation was viewed as responsible for the near-extinction of whale stocks on the Northwest Coast. Nevertheless, as reviewed below, it appears that, in addition to the decline in whale stocks, the Makah's increasing involvement in the pelagic fur sealing industry also contributed to the Tribe's cessation of the whale hunt.

The skills that made the Makah successful whale hunters also made them valuable participants in the pelagic sealing industry of the nineteenth century. This commercial industry was an outgrowth of the Makah Tribe's aboriginal subsistence and fur-trade sealing efforts. By the 1860s, commercial sealing, relied substantially upon a contracted, aboriginal wage-labor force with the keen knowledge of navigation and watercraft needed to succeed at sealing. The shore-based hunt was considered dangerous, as the hunters followed the seals far from land in open canoes. In 1865, the Indian Agent at Neah Bay began chartering schooners to assist the Makah in their offshore hunts (Lane, cited in Crockford 1996). By the mid-1870s, the schooner owners benefited from the near-abandonment of the aboriginal people's shore-based seal hunt, as more men signed on to work from schooners and hunt seals (Crockford 1996).

The pelagic seal hunt relied upon certain elite tribal men continuing in their role as administrators of community economic activities. Whereas these men formerly organized the harvest and distribution of local resources, they now organized crews for the schooners. However, the more equitable distribution of the proceeds equalized the relative ranking of the participants, as the trade economy elevated the resource beyond the level of subsistence and put greater wealth directly in the pockets of crew members (Crockford 1996; Goodman and Swan 2003). Commoners were now ostensibly equal to chiefs, with opportunities available to them as individuals. Thus, the titled class could no longer expect the privileges that aboriginal whaling had helped them maintain, except in ceremonial potlatches and social networks. By 1875, sealing for furs was the Makah Tribe's chief form of income. By 1893, Makah Tribe members owned 10 sealing schooners. These vessels earned a healthy income for their aboriginal owners, but set these men apart from those who did not share in the profits of the new economy. Eventually, over-harvesting and government regulations led to diminished profits and, ultimately, the end of the seal hunting industry. In 1897, the United States government signed an international convention that effectively banned pelagic seal hunting by its citizens, and the once-successful Makah hunters were left waiting for compensation for their lost business, which they believed had been secured to them by treaty. As late as 1957, Murray (1988) reports the Makah Tribe was still appealing to Washington for payment due to losses incurred because of the 1897 law and the seizure of a Makah sealing schooner operating in Alaska. Shooting harbor seals for food continued through the 1990s, long after the hunting of fur seal ceased, as seal oil provided the Makah Tribe with fat that was rendered into oil and used as a condiment (Sepez 2001).

Government agents among the Makah Tribe made considerable, yet ineffective, efforts to promote self-sufficiency through agriculture on the reservation. Some agricultural opportunities became attractive to the Makah Tribe, especially because crop production provided cash, was open to all members of society, and, in the case of the hop and berry fields, permitted families to remain together while they worked as wage laborers. Unlike occupations such as sealing, in which only men were hired, and several Makah men became affluent, whole families could be employed on farms for low wages. Government agents also encouraged Makah children to adopt new values introduced through Christianity and education. In the 1870s, the United States government made potlatching, bone games, and other ceremonial activities illegal, as these activities were regarded as primitive and backwards, resulting in the Makah Tribe's loss of hosted occasions that advanced and recognized the status of leading whaling families (Goodman and Swan 2003). By the early 1900s, the Makah Klukwali (wolf ceremony), and Tsayak (curing ceremony), secret societies involving dramatic reenactments that had been performed by such families, had faded from public view (Goodman and Swan 2003). These secret societies either relocated to offshore islands or adopted a European-like façade to avoid interference by American authorities.

Another direct effect of government policy occurred in 1879 when the first election of chiefs or headmen took place at Neah Bay, followed by elections in the other Makah communities (Goodman and Swan 2003). It is likely that the community elected men of high rank, thus undermining the Indian agents' efforts to equalize the position of all Makah Tribe members. Introduction of the dominant American society's values, including the ideal of equality among all persons, was an expressed goal of United States government Indian assimilation policy in the late nineteenth century (Renker 2002; Goodman and Swan 2003). Yet the Indian agents' attempts to displace the authority, and consequently diminish the acquisition of wealth that accompanied chiefly positions, including that of the titled men who once carried out the whale hunt, took its toll on the community's recognition of traditional leadership. In the absence of the hereditary system, disagreements arose among those still claiming chiefly descent who expected recognition of the rights that flowed from these inherited positions (Goodman and Swan 2003). Despite changes in leadership positions, Makah families of high status kept alive some of the practical and ritual knowledge associated with the whale hunt, even in times of inactivity, although the relative influence of these families within the community declined with the changing economy (Drucker 1951; Goodman and Swan 2003). Drucker found similar retention of whaling knowledge among the Nuu-chah-nulth (1951). In the mid-1930s, he found that the chiefs of one group passed down "both ritual and practical features of the [whaling] complex" to four generations without whaling, before their resumption of the hunt. According to Renker (2007), this transfer of whaling knowledge within Makah families has continued to the present day. The Tribe's 2007 needs statement explains as follows:

> …the Makah desire to reinvigorate the whaling tradition never dissipated. Families passed on whaling stories, traditions, and secrets from generation to generation. Whaling designs and crests still decorated public buildings and private homes. Accounts of Makah whalers were read again and again. Whaling displays in the Makah Cultural and Research Center and other museums kept visual scenes in the heads and hearts of Makah people. (Renker 2007)

3.10.3.5 Contemporary Makah Society

Several post-contact factors (that is, influences brought about after the arrival of the first Europeans in the late eighteenth century), including epidemic disease and mandatory schooling, resulted in consolidation of the five traditional villages into the single community situated at Neah Bay where most of the on-reservation Makah population now resides. The Neah Bay community primarily consists of single-family dwellings, including mobile homes and Housing and Urban Development houses, with housing for seniors located in the center of the village across from the Senior Citizens Center. The churches, schools, public health facilities, Makah Cultural and Research Center, and a large community center where revived potlatches, bone games, and other community functions are held are located in the community of Neah Bay.

Since 1931, Neah Bay has been connected with communities to the east by road on the Olympic Peninsula, although Makah life remains oriented to the sea. Subsistence and commercial salmon and halibut fishing have remained central to the Makah economy, especially after the cessation of the pelagic sealing industry at the end of the nineteenth century, due to the reservation's proximity to some of the biggest halibut fisheries on the Pacific coast (Colson 1953; Sepez 2001). From the 1950s through the 1970s, Makah men worked as loggers cutting timber from the reservation and nearby hills (Colson 1953).

The Makah Air Force Base, established in the area in the 1940s, closed in 1988. Its facilities are now occupied by tribal agencies and Tribal Council offices (Goodman and Swan 2003). Notwithstanding personal preference, a chronic housing shortage at Neah Bay now requires some tribal members to live in neighborhoods outside of Neah Bay, specifically Wa'atch, Baadah, Pacific Beaches, Diah't, and a housing development at Eastern Bayview (Sepez 2001).

The lineage group, or Makah family, is the fundamental element of contemporary intratribal identity, according to Sepez (2001), who notes that it is also the basic social unit in which cultural traditions are passed between generations. Families hold divergent views of tradition, especially in spiritual and ceremonial activities, but also in the types of natural resources harvested and the amounts consumed. Most households, however, consume local subsistence foods during the year (Sepez 2001).

Logging that sustained the community relatively prosperously in the mid-twentieth century has now declined, although the Tribe operates Makah Forestry Enterprise, an expanding company engaged in forest management both on and off the reservation. Fishing, which had also declined, is now providing a higher total income than in the recent past, due to the development of trawl fisheries. Apart from these industries and a few small business enterprises, government is the largest employer in the area. Makah members no longer work in agriculture, because the hop and berry fields of western Washington turned into residential areas. Tribal artists produce jewelry, silk screen prints, and clothing with aboriginal designs for sale in local shops.

In response to the 1934 Indian Reorganization Act, the Makah Tribe wrote a tribal constitution and created the *Makah Tribal Council*, which replaced the former system of chiefs as the daily political arm of the Makah Tribe. Any enrolled member of the Tribe who resides on the reservation is now eligible to run for office, regardless of the class, rank, or status of particular ancestors (Goodman and Swan 2003). Other government policies were also reversed by the 1934 statute, particularly the previous practice of allotting tribal land to individuals. The act also supported Indian religious freedom and promoted a revival of Makah culture (Goodman and Swan 2003). Congress enacted the American Indian Religious Freedom Act in 1978 to further protect and preserve American Indians' inherent right to freedom to believe, express, and exercise their traditional religions (Trope 1994). This act was followed the next year by the Archaeological Resources Protection Act of 1979, which specifically mandates that the American Indian Religious Freedom Act be considered in the disposition of archeological resources. Subsequent legislation, the Native American Graves Protection and Repatriation Act of 1990, mandated the return of Makah and other tribes' sacred objects, objects of cultural patrimony, human remains, and associated funerary objects from federal agencies and federally funded museums (and universities) (Thornton 1994).

Makah Days, initially started in 1926 to celebrate the extension of American citizenship to American Indians, have evolved into a major three-day event held each August. The event celebrates Makah culture and attracts hundreds of visitors, both aboriginal and non-aboriginal. Months of community preparation culminate in a cultural festival highlighting traditional foods, dancing, singing, and games, in addition to more contemporary events such as a parade, fireworks, and sporting events (Tweedie 2002). For this occasion, families share their less prestigious songs and offer training in dancing to non-family members. The songs and dances are used for public performances that, along with displays of athletic excellence, generate feelings of Makah solidarity in friendly opposition to other tribes, reinforcing the Makah Tribe's identity (Bates 1987).

Traditional Makah ceremonials that had declined by the 1950s have had a resurgence, beginning in the 1960s, due to the diligence of a small group of elderly Makah women who were well trained as children and retained knowledge of ceremonial affairs. They guided a new generation of Makah Tribe members who valued the cultural traditions of their people and began hosting community events (Goodman and Swan 2003). This coincided with the archaeological recoveries at the ancient Ozette site, which provided a material foundation for the revitalization of cultural activities. The Ozette investigations provided an important impetus for renewed respect of and interest in the knowledge of Makah elders who worked cooperatively with archaeologists in identifying artifacts. These individuals also provided the necessary guidance to establish the Makah Cultural and Research Center, a tribally owned and operated institution committed to the support of Makah cultural activities and the interpretation of the Ozette artifacts (Erikson 2002). The Makah elders decided to showcase the hunting of whales and seals in the Makah Museum's displays (Sepez 2001).

A number of clubs devoted to cultural activities also began in the 1950s and 1960s, including the Makah Club, the Sla-hal Club, the Makah Arts and Crafts Club, the Hamatsa Club, the Makah Canoe Club, and the Warrior's Club (that honored tribal members who served in the United States military). The revaluation of Makah traditions that occurred during this time provided an impetus for families to bring out songs and dances that had not been performed in decades (Erikson 2002). Federal funds made supplementary cultural programs possible, including a comprehensive summer program with funds for elders to develop classes in traditional crafts, music, and the Makah language (with a Makah language K through 12 program in the schools) (Erikson 2002:111 to 119). The resurgence of these programs has provided new outlets for Makah traditions; community events are now common occasions for singing and dancing, and the museum provides ongoing educational programming (Erikson 2002:168-171).

Potlatching increased in the 1960s, along with the resurgence in cultural awareness. Among the Makah tribal members, this activity appears to fluctuate with economic times. When better economic prospects returned with an improved United States economy in the 1990s, several families hosted potlatches, some costing as much as $15,000 per ceremony (Goodman and Swan 2003). Ceremonial affairs may lack the complexity of former events, Goodman and Swan (2003) observe, yet many potlatch elements described in the nineteenth century can still be seen today as singers perform family-owned songs, young people receive ancestral names, guests participate in group dances, and the hosts serve great quantities of traditional native foods. Many of these songs and dances are those passed down among high-status whaling families and are used to publicly display their family wealth gained and maintained through generations of whaling.

Some of the five Christian denominations that established churches in Neah Bay have a history of intolerance towards aboriginal spirituality, while others have recognized the compatibility of Christian beliefs and Makah spiritual life. For traditionally minded Makah, a spiritual life is tied to the lands and waters of their territory, remote places devoid of human activity where private cleansing rituals can take place without intrusion, and initiates can draw near to the supernatural part of the world. Individuals perform rituals and seek proficiency in whatever endeavor they undertake by strengthening their relationship with particular spirits (Drucker 1951). The arduous requirements of whaling have led to the rejuvenation among some Makah hunters of whaling rituals, which are based on private family knowledge (Braund et al. 2007).

3.10.3.5.1 Makah Whaling

The cultural role of whaling is vividly demonstrated in the archaeological record and in the ethnographic accounts of the twentieth century that have been summarized above. These published accounts now supplement the Makah Tribe's oral traditions as they prepare for the contemporary whale hunt and consider past traditions for future manifestations of their culture. Many traditions related to whaling have waned, however, since the Makah Tribe's cessation of the hunt in the 1920s. Nevertheless, some of those individuals taking a leading role in revitalizing this occupation are from whaling families of high status who trace their ancestry to men who formerly hunted whales (Tweedie 2002). All this occurs at a time when the Makah Tribe is actively revitalizing its language and cultural traditions. According to Renker (2007), "Makah people had never stopped educating their children about their respective familial whaling traditions." Furthermore, the public school included a whaling curriculum, and the Makah Cultural and Research Center supported whaling education efforts. Renker (2007) noted, "While non-Makahs perceived a large temporal gap in the whaling history of the Tribe, tribal members saw continuity. Many individuals were patiently waiting for the whaling traditions to be taken from storage and implemented in reality."

The day in 1997 that the IWC acted on the United States' request on behalf of the Makah Tribe was marked on the Makah Reservation with celebrations, including giving tribal employees a half-day off and 30 local vehicles forming an impromptu parade, some of the cars and trucks appropriately decorated and horns blaring. An anthropologist observing the event later wrote, "It seemed that the entire village lined the parade route" (Tweedie 2002). The celebration continued the following week with a community potlatch at which tribal singers performed victory songs.

Support for the 1999 and 2000 hunts was subsequently confirmed in a household whaling survey compiled in 2001 and 2002 by the Makah Tribe. Surveyors canvassed the opinions of 35 percent of the on-reservation population concerning their views on the Tribe's resumption of whaling (Table 3-32). The expressed purpose of the survey was to address concerns of some non-tribal citizens who believed that the Makah Tribe did not support whaling and wasted the whale products received from the 1999 hunt. Anthropologist Ann Renker Ph.D., a Northwest Coast specialist with research experience among the Makah, designed the survey with input from the Makah Cultural and Research Center. Dr. Renker also analyzed the results of the surveys, administered by a team of trained Makah members. Of the 217 households of enrolled Makah members randomly selected and contacted for the study, 159 households agreed to participate. Four selected household heads were not interviewed due to their vocal public opposition to the hunt. Nevertheless, the survey instrument for each of these individuals was marked negative for all questions regarding support of the hunt or use of whale products and, thus, was included in the tabulation of results representing the views of 163 households. All respondents were at least 21 years and enrolled Makah members residing on the reservation. The respondents' confidentiality was maintained by using numbered surveys, keyed to a master list of households used for administration purposes, but not released to Dr. Renker during her analysis of the results. The Makah Cultural and Research Center holds the original surveys under restricted access. Dr. Renker's analysis is made available in report form for this DEIS assessment.

TABLE 3-32. MAKAH ATTITUDES TOWARD WHALE HUNTING

ATTITUDE	RESPONSE BY PERCENT (%)[1]
Makah Tribe should continue to hunt whales	93
Makah Tribe should not hunt whales	6
Undecided	1

[1] Survey had 163 respondents; percentages were rounded to the nearest whole number.
Source: Renker 2002.

As explanations of the interests and goals driving continuance of the whale hunt, Makah Tribe members' comments were placed into four categories during the survey review (Table 3-33). The survey noted that 46 percent of respondents cited treaty rights to support the whale hunt (Renker 2007). For many Makah Tribe members, treaty rights, including the explicit right to hunt whales, have become an integral part of their cultural identity. The 150th anniversary of the signing of the Treaty of Neah Bay in 2005 was accompanied by a large community-wide potlatch and an essay contest for local high school students, which was sponsored by the Makah Tribal Council (Renker 2007). Thus, treaty rights play a significant role in Tribe members' present cultural identification with whaling.

Reasons given by the 7 percent of respondents not supporting the hunt, according to Bowechop (2005a), focused on "the timing of the hunt, feeling that the Tribe should wait for a more appropriate time," and "the inequality of women's involvement in the actual hunt."

TABLE 3-33. MAKAH REASONS FOR SUPPORT OF WHALE HUNTING

REASONS FOR SUPPORTING WHALE HUNTING	RESPONSE BY PERCENT (%)[1]
Treaty rights	46
Better nutrition or the desire for a traditional diet	35
Maintenance or restoration of cultural heritage or traditions	36
Moral or spiritual benefits that could be derived from the hunt	20

[1] Percentages are rounded to nearest whole number.

Source: Renker 2002.

The results of the survey reported in Renker (2002) were supported in an independent survey conducted by anthropologist Jennifer Sepez in connection with research undertaken for her doctoral thesis. In her random sample survey carried out in 1998, Sepez (2001) found that 73 percent of households planned to eat whale obtained from future hunts, but she cautioned that many household residents who did not plan to eat whale themselves explicitly stated that they supported the effort on behalf of those households with residents who wished to do so. Moreover, some household members clarified that, while they would not cook whale products themselves, they would consume whale if it were served at community feasts. Looking to the future, the Tribe's 2002 household whaling survey indicated that 87 percent surveyed desired whale meat as part of their regular diet, and 72 percent voiced a desire for whale oil (Renker 2002). Hence, both studies independently confirmed an expressed preference for this traditional food among the Makah Tribe.

The Tribe conducted the household whaling survey following the 1999 kill of a gray whale that was towed to Front Beach at Neah Bay for butchering. Seventy-nine percent of the survey respondents watched television coverage of the whale being taken. A larger number, 81 percent of the 163 respondents, met the hunters on the beach when the whale was brought ashore. An estimated 1,400 tribal and non-tribal people witnessed the arrival of the whale and its hunters to Neah Bay. People traveled to Neah Bay from other communities to participate in the festivities and camped or stayed with relatives during festivities associated with the successful hunt (Renker 2002).

When asked about the positive benefits to be derived from continuing the hunt, 52 percent of the respondents reported a correlation between the hunt and a better lifestyle (Renker 2002). They viewed the hunt as a vehicle to reinforce traditional Makah values, such as pride, self-esteem, and male responsibility, in addition to combating the contemporary problem of substance abuse (Renker 2002, Braund et al. 2007). As preparation for the 1999 and 2000 hunts, Makah whalers reported enduring intense physical and spiritual training, which culminated in a deep bond between whalers (Braund 2007). Such preparation is considered a private affair among the Makah families (Braund et al. 2007). In some cases, whalers identified individuals who underwent major life changes as a result of participating in the whale hunt (Braund et al. 2007).

The Tribe's 2007 needs statement indicates that the lack of active whaling in the community since the 1999 and 2000 hunts had already negatively affected Makah youth by denying them role models in the form of active whalers. It contains the following passage: "[T]he lack of whaling made it harder for Makah youth to find role models among whalers and removed an incentive for young men to focus on the physical and spiritual requirements necessary to a training regimen" (Renker 2007).

As in the past, the killing of a whale is a focal event in which many Makah people are directly or indirectly involved. Table 3-34 lists some of the activities involved in the 1999 whale hunt, with a tally of the numbers or percentages of Makah Tribe members involved in each activity, based on data obtained during the household whaling survey and contemporary ethnographic literature (Renker 2002; Bowechop 2004, 2005a). Some individuals are counted in more than one category in Table 3-34

While only four canoes of men participated directly in towing the whale ashore in 1999, 38 percent of the Makah surveyed reported that they had participated in ceremonial activities connected with whaling since the 1999 hunt.

TABLE 3-34. NUMBERS AND PERCENTAGE OF PARTICIPANTS IN THE 1999 MAKAH WHALE HUNT

ACTIVITY ASSOCIATED WITH 1999 HUNT	NUMBERS/PERCENTAGE OF PARTICIPANTS
Members of Whaling Commission	23 Makah men representing "all major families"
Preparation of equipment, including canoe	2 Makah men, plus Nuu-chah-nulth mentors who built canoe, and 20 to 25 people making equipment
Training for hunt crew	18 to 20 Makah men
Whale hunt crew	1 canoe (1 head harpooner, 7 men) and 1 chase boat (5 people), all Makah
Towing crew	5 canoes (main canoe and 4 support canoes) and 1 fishing boat; about 60 people, 4 canoes from supporting Northwest tribes
Attendance on beach	1,400 people, mostly Makahs
Butchering	100 people, mostly Makahs
Distribution crew	50 Makahs
Consumption of meat/oil	81% of household whaling survey respondents
Attendance at post-hunt community feast	95% of household whaling survey respondents; "Thousands of other friends and relatives joined our tribe." Approximately 3,000 people total
Attendance at parade	79% of household whaling survey respondents; about 400 people total
Participation in post-hunt ceremonials	38% of household whaling survey respondents
Use of bones	Approximately 60 school children, mostly Makah
Use of baleen	8 Makah hunters

Source: Bowechop 2004 (413), 2005a.

Considering that 43 percent of the respondents also stated that the hunt fostered Makah and intertribal unity, the hunt appeared to be a means of bolstering social accord within the community and provided some positive support for the physical and mental health of the Makah Tribe.

The hunt also provided the opportunity for the revival of Makah whaling rituals and traditional knowledge after a 70-year hiatus (Braund et al. 2007). Hunters reported that the spiritual and physical training, the new-found whaling knowledge and skills gained from the experience, and the activation of inherited whaling customs and attitudes from older Makah members (obtained orally and through the ethnographic collaboration of previous generations) strengthened tribal member identity as descendants of Makah whalers (Tweedie 2002). Whaling songs and rituals also resumed following the 1999 hunt, with more people participating in family songs and sharing traditional knowledge (Braund et al. 2007).

Reintroduction of whaling activities also facilitated a specific vocabulary, now mostly in English, but some in the Makah language, that encapsulates context-based traditional ecological knowledge that once was widespread in the community (Bowechop 2005a). Without engaging in the hunt, this knowledge lay dormant in the memories of the elders in a few families and in the ethnographic accounts of previous generations. Bowechop (2005a) reports a gradual increase in the attendance of language and cultural classes, with the highest attendance corresponding with the resumption of the whale hunt.

The whale hunt provided new experience-based educational opportunities that went beyond the current efforts of the Makah Cultural and Research Center to recover the language, crafts, and Makah ecological concepts that Sepez (2001) explains are offered in schools and at summer camps and underlie and sustain the elders' ecological teachings. The quest for knowledge relating to the ancient activity of whaling reached beyond the whaling crew and community children, for the majority of respondents in the Makah household whaling survey reported a desire to learn more about preparing whale products and using whalebone. They expressed a willingness to share such information with other Makah Tribe members (Renker 2002). Seventy-six percent of Makah households expressed a desire for whale bones, presumably to revitalize certain crafts. The Makah Tribal Council, however, decided to offer the 1999 whale hunt bones to the local school for a bone preservation project. Instructors taught Makah students how to clean skeletal remains and reassemble the whale skeleton for museum display. Early in December 2005, with the reconstruction completed, the whale skeleton was hung in the Makah Cultural and Research Center. Approximately 60 students participated in this project (Bowechop 2005a).

Participation in the 1999 hunt also allowed residents to experience a connection to the past that would not otherwise have been possible (Braund et al. 2007). The connection to their whaling ancestors and to the physical environment also renews Makah cultural and historical identity as whalers (Braund et al. 2007). Renker (2007), discussing the importance of ceremonial activities and practices related to the whale hunt in enhancing the spirituality of Makah Tribe members, wrote "…MWC [Makah Whaling Commission] members share the opinion that the ceremonies which must occur before a hunt, and the clean/sober lifestyle that hunters and their families must have, are a critical part of the Makah Tribe's spiritual profile." She also referred to the Makah whale hunt as "a manifestation of the spiritual connection between Makahs and their Creator." Renker (2007) later suggested that because the activity of whaling is so closely linked with physical, spiritual, and ceremonial obligations, the lack of whaling, especially after already being reintroduced to Makah people in recent years, is harmful to the spirituality of the Makah Tribe. Renker (2007) wrote the following:

> Additional whale hunts bring important ceremonial obligations, because spiritual preparation is an obligation of the whaling crew members and their respective family

> members. Now that almost half of the Makah Tribe's members participate in ancient religious ceremonies, the lack of an active hunt makes it impossible for certain spiritual rituals to be performed. A spiritual void of this nature is devastating for Tribal members, and the connection between unhealthy social behaviors and the inability to practice traditional rituals is common in the writings of noted American Indian authors (Deloria 1973, Josephy 1982).

Renker's tribal survey found that 81 percent of the respondents consumed whale products (blubber, meat, or oil) obtained from the 1999 hunt, although 87 percent would like to have these products available in the future (Renker 2002). Sepez (2001) also quantified the consumption of whale products obtained from the whale taken during the 1999 hunt. The whale provided roughly 2,000 to 3,000 pounds of meat and 4,000 to 5,000 pounds of blubber, most of which was consumed at the community potlatch. Community households received approximately 1.8 pounds per capita distribution of blubber. Together with the estimated 0.55 pound of meat, Sepez calculated that the whale products consumed in 1999 equaled about 2.4 pounds per capita.

Members of other tribes attended the community's celebrations in 1999 witnessing the proceedings and sharing food – necessary components of traditional ceremonials by which a group establishes its status with other groups. When the Makah Tribal Council hosted the community potlatch after the 1999 hunt, the individual whalers received public recognition for their proficiency and commitment, and the Makah, as a tribal group, reaffirmed itself as people of wealth and history who maintain a relationship with the resources of their territory (Bowechop 2004). Within the cultural framework of the Makah people, no other activity besides the whale hunt and community feast is considered to embody such powerful metaphoric expression. Symbols are made meaningful through experience and action, and the whale is the Makah Tribe's symbol for cultural pride and independence. The Makah Tribe regarded the hunt as a means to revitalize and transfer its cultural knowledge associated with the activity.

The resumption of the hunt also provided the Makah Tribe with an opportunity to highlight the relationship with the related Nuu-chah-nulth people of British Columbia, Canada. Both engaged in hunting whales and practiced highly complex rituals believed to ensure the success of the hunt. Makah whalers traveled to Vancouver Island for several weeks before participating in the 1999 hunt to learn whaling techniques and traditions from knowledgeable Canadian elders. Some tribal members from Alaska and British Columbia attended the Makah Tribe's celebration of the 1999 kill (Braund et al. 2007).

In 2006, six years after the last attempt by Makah whalers to hunt whales, the Makah Tribal Council commissioned a second whaling survey to gather information about residents' attitudes toward participation in whaling, including the actual hunt, ceremonial activities, and consumption and use of whale products. The 2006 survey was designed to follow the same methods used during the 2001 survey. The results of this survey are discussed in the Tribe's 2007 needs statement (Renker 2007).

Support for Makah whaling remained high in 2006, with 88.8 percent of respondents indicating that they supported the continuation of the Makah Tribe's efforts to hunt whales (Renker 2007). This percentage had decreased slightly since 2001, when 95.6 percent of respondents voiced support for the whaling efforts. However, the percentage of respondents opposing the effort to hunt whales increased by less than one percentage point, to 4.0 percent. The remaining respondents were unsure about whether whaling efforts should continue, citing reasons such as financial burdens on the village due to legal efforts, concerns about "racial animosity" which rose during and following the 1999 and 2000 hunts, and the effect of whaling efforts on fishing quotas and treaties.

Most respondents who supported whaling viewed the whaling efforts as being positive for the Makah Tribe (Renker 2007). They attributed the whaling efforts with helping to restore or maintain heritage and ceremonies, as well as increasing tribal unity and encouraging healthy living among youth.

A high percentage of respondents (80.3 percent) continued to desire whale products for consumption or use. Respondents also expressed interest in learning more about the butchering, processing and use of whale products (Renker 2007.).

One area in which positive responses increased significantly from 2001 to 2006 was in regards to participation in ceremonial activities (Renker 2007). The percentage of respondents participating in ceremonial activities rose from 25.8 percent in 2001 to 41.5 percent in 2006. Regarding this outcome Dr. Renker stated the following:

> The HWS II (Household Whaling Survey II) attests that the ceremonial aspects of the Makah whale hunt are once again becoming a standard part of the life of a majority of Tribal members, even when the Tribe is prevented from hunting because of outside legal struggles (Renker 2007,53)

3.10.3.5.2 Makah Subsistence Consumption

An overview and analysis of contemporary Makah subsistence foraging, focusing on hunting, fishing, and shellfish collecting, indicated that the Makah people continue to rely on their U&A resource harvesting areas for a significant portion of their diet (Sepez 2001). The survey documented the use of approximately 80 species, with most of the diversity concentrated in the marine resources. While the author of the study was reluctant to rank the resources in terms of importance ─ largely due to the inability of statistics to discern nonquantifiable qualities of resources that make them important ─ harvesting and consumption patterns did emerge from the data.

Using household surveys from a randomly selected sample as the basis for her analysis, Sepez (2001) found that 99 percent of the households indicated some type of consuming of local resources for subsistence purposes during the study period. Fully 71 percent of households engaged in harvesting resources, while 94 percent received resources harvested by another household, indicating that sharing resources was a common practice among tribal members. Table 3-35 presents the percent of households using local resources obtained directly or through exchange during the 1997 and 1998 study period.

TABLE 3-35. PERCENTAGE OF HOUSEHOLDS USING LOCAL RESOURCES DURING 1997 TO 1998

FOOD RESOURCE	PERCENTAGE OF HOUSEHOLDS (%)
Halibut, salmon, clams, crab	76 – 100
Mussels, deer, elk, goosenecks, seal, salmon eggs, barnacles	51 – 75
Steelhead, lingcod, olive shells, chitons, octopus, rockfish, smelt, blackcod, herring eggs, grouse	26 – 50
Urchins, lingcod eggs, local cow, petrale sole, trout, tuna, bear, scallop, oysters, sole/flatfish, sea cucumber, squid, sturgeon, true cod, shrimp, rabbits, abalone, duck, pigeon, skate, sea lion, small gastropods, wolf eel	1 – 25
Goose, porpoise, sea anemone, sea otter, sea turtle, shark, whale[1]	

Source: Sepez (2001).

[1] Resources currently used, but not included in the survey

Table 3-35 represents reported local use of the resource. The survey found that the widest range of households uses marine resources. Further analysis indicated that fish accounted for 55 percent of meat and seafoods in the Makah diet, a figure that highlights the cultural significance of marine resources when compared to the average 7 percent of meat and seafoods that occupy the diet of other Americans (Sepez 2001).

Sepez (2001) concluded in her study of Makah subsistence that the tribal members' preference for fish and other resources produced through subsistence channels was specific to the type of food being chosen, but that several social and economic factors influenced the role of subsistence in the contemporary tribal lifestyle:

- Perception of subsistence foods as free for the taking
- Link with cultural identity
- Perception that seafoods taken from other places are unclean or mistreated
- Pleasure in undertaking subsistence activities
- Sense of connection to the local environment and to those who used the resource in the past

Makah members articulated similar statements when asked about their desire for whale products (Renker 2002). No food is more symbolic of the traditional Makah culture than whale, for its consumption serves as a metaphoric reminder of the wealth, history, and social structure of the community (Braund et al. 2007).

The Tribe's 2007 needs statement provides a detailed account of current health issues present within the Makah's and other American Indians' communities and discusses the potential nutritional benefits of consuming whale products, suggesting that a return to eating whale could lead to better overall health of Makah Tribe members, both physically and spiritually (Renker 2007).

Sharing food in contemporary Makah society, Sepez (2001) observes, is "an accepted and expected aspect of subsistence" and recognizes a traditional obligation for generosity, particularly extended to those in need. Within a complex system of reciprocity and redistribution, sharing bolsters one's status within the community and serves to enact one's tribal identity. Table 3-36 charts the percentage of Makah harvesters who shared part of their gains during the 1997 to 1998 study year. Seal meat and oil emerged as the resources most likely to be distributed during the time of the survey, with all hunters of seal reporting distribution of the meat or rendered oil. Sepez (2001) notes that the resource column lists items in descending order of percent of harvesters giving some portion away.

TABLE 3-36. PERCENTAGE OF HARVESTERS OF EACH RESOURCE WHO GAVE AWAY SOME PORTION, 1997-1998

RESOURCE	PERCENTAGE OF HARVESTERS (%)
Seal	100
Halibut, black cod, smelt, octopus, clams, salmon, gooseneck barnacles, fish eggs	99 – 67
Crab, elk, mussels, deer, steelhead, scallops, chitons, ling cod	66 – 34
Olive shells, barnacles, rockfish, grouse, urchins	33 – 1
Trout	0

Source: Sepez (2001).

3.10.3.5.3 Symbolic Expression of Whaling

In both traditional and contemporary Makah society, depictions of the whale and the whale hunt are very meaningful. These symbols were once used only on the property of elite members of Makah or Nuu-chah-nulth society and, therefore, appeared on items such as dance screens or curtains narrated visually with images celebrating the lineage's history, memorial posts to commemorate a chief's greatness, twined whalers' hats decorated with motifs of whaling scenes, wooden images used in ceremonials, and small personal amulets or charms imbued with spiritual power (Black 1999). Chiefs have also tattooed whales upon their chest (Koppert 1930). The traditional view is focused primarily on the relationship between humans and whales, the transformation of the whale into wealth, and the physical features underpinning the metaphors of strength, courage, and generosity.

Ethnomusicologist Frances Densmore photographed a dance curtain containing the large image of a thunderbird carrying a whale, along with other images, hanging in front of one of the walls of the Neah Bay community hall where dances were performed for Makah Days in 1926 (Densmore 1939). James Swan, a New England pioneer who lived among the Makah in the 1860s, was impressed by a painting of a thunderbird on a chief's house at Neah Bay. He recorded the Makah Indians' description of thunderbird as a supernatural giant who killed whales with lightning fish tied around his waist, then carried them back to the mountains to eat (Quimby 1970). According to Janine Bowechop, current Executive Director of the Makah Cultural Research Center, a commonly held Makah belief is that during a time of starvation, Thunderbird brought a whale to the Makah people to eat, then showed them how to hunt whales.

The symbolic use of whales within contemporary Makah society continues to be important. As Renker (2007) wrote:

> Whales are everywhere on the reservation. They are the dominant art icon in Neah Bay and adorn T-shirts, jackets, jewelry, signage, and a good deal of the public art in the village, including images inside and outside the public school, as well as the Tribe's buildings. Makah children "doodle" whale images on their school papers and folders, and create serious artwork with whales, thunderbirds, and wolf masks for local art contests.

Statements made by Makah participants after the 1999 hunt suggest that the contemporary whalers' association with the whale retains some of the qualities described in the ethnographic literature (Tweedie 2002), but the symbolic use of whales and whaling has extended beyond an association of a chief with his wealth to that of the community as a whole. Symbols of this traditional discourse that were rooted in the practice and experience of the elite now inform the contemporary model of tribal self-sufficiency. The cessation of the whale hunt and its associated privately owned rituals and ceremonials, along with changes in the traditional Makah social organization, resulted in lessening the direct relationship between the whale and the whalers. Subsequent emergence of the whale as a secular image nevertheless represented the loss of a former way of life, one in which physical and mental strength brought glory and wealth to the chiefs and, thus, to the community at large. Whale hunting in the current discourse possesses symbolic properties and qualities that make it a potent vehicle for the strength of Makah identity, sovereignty, and cultural revitalization. Hence, resumption of the hunt, as Janine Bowechop (2004:412) concluded in her essay, *Contemporary Makah Whaling*, was necessary to help her people become healthier and stronger and to close the gap between the past and the present.

3.11 Noise

3.11.1 Introduction

The following section documents noise-related issues pertaining to the proposed Makah whale hunts. Included are discussions of relevant noise-related policies and jurisdictions, sensitive noise receptors in the human environment, and background noise conditions near the project area. Key parameters for analysis include ambient noise levels in the project area and the distance between sensitive receptors and noise-producing project activities. See Section 3.5.3.3, Sensitivity of Wildlife to Noise and Other Disturbance, for a discussion of the potential for disturbance to wildlife and key wildlife use areas, such as seabird rookeries and haulouts for marine mammals.

Noise is generally defined as unwanted sound (EPA 1971). Sound level is expressed in units called decibels (dB). The dB scale quantifies sound levels relative to a reference point of 0 dB, which is defined as the threshold of human hearing and is roughly equivalent to the sound of a mosquito flying 10 feet away. To account for the large range of sound pressures the ear can detect, the dB scale is logarithmic. A 10-dB increase in sound level is perceived as a doubling of loudness. The ear is not equally sensitive to sound at all frequencies or musical pitches; two sounds of equal intensity (i.e., with equal dB values) may be perceived as having different loudness levels if they have different frequencies. Very high-pitched whistles demonstrate the relative sensitivity of the human ear (as compared to the ears of other species) at certain frequencies; dogs readily hear these sounds, but they are nearly inaudible to humans.

Sound frequency is measured in terms of cycles per second, or hertz (Hz). The human ear is most sensitive to sounds in the frequency range of 1,000 to 5,000 Hz. To account for this sensitivity, a process called frequency weighting is often used in sound descriptions. The most widely used system is A-weighting, in which noise in the frequencies of maximum human sensitivity factors more heavily than other frequencies in determining the overall noise level. Decibel values in this system are commonly denoted as dBA. Most noise regulations use the A-weighted scale to define acceptable limits for noise levels. See Section 3.5.3.3.4, Marine Mammals and Underwater Noise, for a discussion of the frequencies at which the ears of marine mammals are most sensitive.

3.11.2 Regulatory Overview

The OCNMS management plan provides no specific direction regarding noise (NOAA 1993). Control of noise is, however, consistent with Sanctuary goals of resource protection and compatible public use. Regulations governing OCNMS prohibit the operation of motorized aircraft less than 2,000 feet above the Sanctuary and within one nautical mile of the shoreline. In addition, FWS recommends a 200-yard exclusionary zone around islands in the Washington Island National Wildlife Refuges to avoid the flushing of nesting seabirds by boat and other vessel traffic.

The Olympic National Park, under federal jurisdiction, is managed consistent with enabling federal legislation to ". . . conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (National Park Service Organic Act, 16 USC 1). The control of noise by park authorities is relevant to leaving the natural and cultural resources and values of the park unimpaired. Noise control is particularly germane in portions of the park designated as wilderness; this includes the park area along the Pacific Ocean coastline. Specific regulations prohibit the operation of "motorized equipment or machinery in a manner that exceeds a noise level of 60 decibels measured on the A-weighted scale at 50 feet; or, if below that level, makes noise which is unreasonable, considering the nature and purpose for which the area was established" (36 CFR 2.12). The Wilderness Act does not establish noise regulations, but it implies that noise should be minimized in designated Wilderness areas to achieve "outstanding opportunities for solitude" (Public Law 88-577).

State of Washington noise regulations in WAC 173-60-040 are in effect statewide. Clallam County has no separate noise regulations and is subject to state standards. Maximum permissible environmental noise levels vary, depending on the land use categories of the noise source and the receiving property. Maximum permissible noise levels range from 55 to 60 dBA for residential properties, 57 to 65 dBA for commercial uses, and 60 to 70 dBA for industrial areas.

WAC 173-60-050 specifies exemptions from maximum permissible noise levels in certain cases, including the following:

- Sounds created by the discharge of firearms on authorized shooting ranges [Exemption applies only from 7:00 a.m. to 10:00 p.m.]
- Sounds originating from forest harvesting and silvicultural activity [Exemption does not apply near residential and recreational areas from 10:00 p.m. to 7:00 a.m.]
- Sounds originating from aircraft in flight
- Sounds created by emergency equipment and work necessary in the interests of law enforcement or for health safety or welfare of the community
- Sounds created by safety and protective devices where noise suppression would defeat the intent of the device or is not economically feasible
- Sounds created by the discharge of firearms in the course of hunting

3.11.3 Existing Conditions

The following sections identify sensitive noise receptors in the project area, followed by a discussion of existing noise levels in the two media of noise transmission (air and water) in the project area. The discussion in this section focuses on sensitive noise receptors in the human environment. The sensitivity of wildlife to noise and other disturbance is discussed in Section 3.5.3.3.

3.11.3.1 Sensitive Noise Receptors in the Human Environment

Sensitive noise receptors include facilities and activities for which excessive noise may cause annoyance, increased stress, loss of business, or other adverse effects. Examples of sensitive receptors include residential areas, hospitals, schools, performance spaces, and businesses. Open space is also noise-sensitive if excessive noise would adversely affect potential recreational use of the space. Nearly all portions of the project area sustain residential or recreational uses, with maximum permissible noise levels between 55 and 60 dBA. Businesses in Neah Bay and the offices of the Makah Tribal Center meet the criteria of commercial property, while timber harvest areas would be considered industrial sites.

3.11.3.1.1 Olympic Coast National Marine Sanctuary

Staff at OCNMS have identified noise as a management issue for the Sanctuary, particularly with regard to disturbance of humans and wildlife (Parrish et al. 2005). Noise associated with aircraft overflights has been identified as a primary concern, but the extent of overflights within the Sanctuary is not known. It is also unclear whether, or how much, disturbance to Sanctuary-protected wildlife results from overflights (Parrish et al. 2005). OCNMS staff report that overflights occur primarily during the summer and that visitor complaints are rare (Parrish et al. 2005).

3.11.3.1.2 Makah Reservation

Sensitive noise receptors on the reservation occur primarily along trails and shoreline areas used for recreation by residents and tourists. Cape Flattery is a Makah Tribe designated wilderness area. South of Cape Flattery, the Pacific coastline is largely wooded; some inland areas are managed for timber harvest. There is little or no human settlement north of Wa'atch Point. The Makah Tribal Center on the north side of the Wa'atch River supports residential, administrative, and commercial uses. Areas farther south include low-density residential development, with several roads near the shoreline. South of Anderson Point to the Olympic National Park boundary, the shoreline is characterized by rocky bluffs and small pocket beaches. Primitive roads and trails provide recreational access.

3.11.3.1.3 Olympic National Park

Within the Olympic National Park, the shoreline is a designated wilderness area accessible only by foot. In most portions of this area, the total number of users is restricted by a wilderness permit system. A trail and boardwalk connect the parking area at Lake Ozette to the shoreline at Cape Alava and Sand Point. The number of visitors to this area is restricted only by the capacity of the parking lot. Because the coastal shoreline portion of the park is a designated wilderness area, this entire area of the park is a sensitive noise receptor.

3.11.3.2 Existing Noise Levels

The following sections describe the baseline conditions of the acoustic environment in the project area, including atmospheric and underwater noise. Particular attention is given to sources of noise associated with a whale hunt, namely, aircraft (e.g., news helicopters and other aircraft observing the hunt and associated activities), and vessel traffic. Section 3.5.3.3, Sensitivity of Wildlife to Noise and Other Disturbance, addresses existing levels of noise and disturbance at marine mammal haulouts and seabird colonies in the project area. Where available, information from the previous hunts is included to provide a background for subsequent analysis of the potential effects of the alternatives.

3.11.3.2.1 Atmospheric Noise

The primary sources of ambient sound in the area are natural, mostly wind and waves. Natural quiet found in wilderness recreation areas is characterized by the absence of human-made noise, which creates conditions that allow visitors to enjoy the intermittent sounds of animals, wind, water, and other natural sources.

In addition to natural sounds, human activities are a source of noise in the project area. Near Cape Flattery, people hear the Tatoosh Island foghorn. The acoustic environment in the area of the Makah Tribal Center is likely characteristic of residential and small town centers, with ambient noise levels ranging from 50 to 65 dBA. Settings where people congregate, such as commercial areas, school playgrounds, and sports fields, are additional local sources of noise. Throughout the area, the most pervasive noise source is traffic on local roads. Noise from individual automobiles and trucks can range from 70 to 90 dBA. Sirens of emergency vehicles are likely the loudest noise source; they produce noise at approximately 130 dBA at 100 feet. The occurrence of such noise is infrequent, irregular, and primarily affects areas next to arterial roads. Noise sources associated with active logging operations include chain saws (110 dBA) and other equipment (80 to 110 dBA). Most timber harvest units associated with the Makah logging operations are located away from residences to avoid noise impacts. However, the Makah Forest Management Plan (Makah Tribe 1999) does not mention noise as an issue to be addressed during logging operations.

Another source of noise in the area is airplane traffic, particularly near the three airports in western Clallam County (Section 3.13.3.3, Air Traffic). The most heavily used airport in the area is the Forks Municipal Airport, which receives an average of approximately 40 operations every day (Washington Department of Transportation 2002a). Noise from aircraft taking off and landing is unlikely to be a major issue in the U&A, however, because the airport is more than 15 miles away from the southern extreme of the U&A. The Quillayute Airport, which has less than 10 takeoffs and landings per week, on average, is approximately 9 miles away from the southern extreme of the U&A. The Sekiu Airport, which has approximately 20 takeoffs and landings per week, is immediately adjacent to the portion of the U&A within the Strait of Juan de Fuca and approximately 20 miles from the Pacific Ocean portion of the U&A.

In their study of overflights in west coast National Marine Sanctuaries, Parrish et al. (2005) gathered information about small, private, general aviation airplanes and helicopters. Such aircraft, typically flown by private pilots for sightseeing purposes, have the potential to disturb humans and wildlife by flying low over Sanctuary waters (Parrish et al. 2005). Other types of aircraft that may occur in the area include regularly scheduled tourist flights, such as those provided by National Park tour concessionaires, and Sanctuary-permitted or Sanctuary-owned research flights. Military and Coast Guard flights also occur over the area (Parrish et al. 2005). During field studies at Tatoosh Island in the summer months (June, July, and August) of 1997 through 2003, researchers from the University of Washington documented 106 instances in which aircraft violated overflight regulations by flying below 2,000 feet within 1 mile of shore in the Sanctuary. The frequency with which violations occurred ranged from approximately 0.1 to 0.75 per hour (Galasso 2005).

During the previous whale hunts, media helicopters and other aircraft likely created elevated noise levels. The Coast Guard used helicopters to enforce the exclusion zone around tribal vessels actively engaged in the hunt (Section 3.14.3.1, Coast Guard). During the successful hunt, three television news helicopters were present throughout the day (United States Coast Guard 1999a). No information is available to document noise levels associated with those sources. OCNMS regulations that require motorized aircraft to fly at least 2,000 feet above certain portions of the Sanctuary probably limited the effects of aircraft noise on residents and recreational users near the hunt. Only one instance of an aircraft failing to observe these regulations was reported during the previous hunts (Section 3.13.3.3, Air Traffic).

Other noise sources associated with the previous hunt included marine vessels used by the whale hunters, protesters, and law enforcement personnel (Section 3.13.3.2.3, Marine Traffic During the Previous Hunt). Most hunt-related activities took place well offshore, and vessel noise was likely inaudible to sensitive receptors in Olympic National Park and OCNMS. To avoid disturbance to resting and breeding birds and marine mammals, the Makah gray whale management plan prohibited the initial strike of a whale within 200 yards of Tatoosh Island or White Rock between May and September. All three strike attempts occurred 1 to 2 miles offshore (NMFS 1999). Increased vessel traffic was likely audible to local residents near the marina and Coast Guard station at Neah Bay and at Clallam Bay, where most protest vessels moored.

3.11.3.2.2 Marine Noise

Marine environments can be noisy. Natural noise sources include wind, waves, precipitation, earthquakes, lightning strikes, and surf. Biological sounds include whale songs, dolphin clicks, fish vocalizations, and the clicking of crustaceans (Urick 1983; National Research Council 2003). Noise sources associated with human activities include commercial shipping, geophysical surveys, oil drilling and production, dredging and construction, sonar systems, and oceanographic research (National Research Council 2003).

Open ocean ambient noise levels estimated from sound data collected in portions of the South Pacific with relatively low levels of human activity suggest that low-frequency sound levels range from 40 to 50 dB (relative to 1 microPascal at 1 meter[9]) in calm seas (Cato and McCauley 2002; National Research Council 2003). In areas of the Pacific Ocean where commercial shipping is more prevalent, measured ambient sound levels have ranged between 80 and 90 dB (Andrew et al. 2002; McDonald et al. 2006). A variety of natural processes increases these levels: precipitation on the ocean surface contributes sound levels up to 35 dB across a broad range of frequencies (Nystuen and Farmer 1987); an increase in wind speed from 5 to 10 knots causes a 5-dB increase in ambient ocean noise across most frequencies. The highest dB noise levels generally occur in nearshore areas where the sound of surf can increase underwater noise levels by more than 20 dB a few hundred meters outside the surf zone across a frequency band from 10 to 10,000 Hz (Wilson et al. 1985; National Research Council 2003).

Among noise sources associated with human activity, surface shipping is widely considered the most widespread source of low-frequency (5 to 1,000 Hz) noise in the oceans (Wenz 1962; Simmonds and Hutchinson 1996; National Research Council 2003). Although there are no data that provide an assessment of long-term trends in ocean noise, increases in commercial shipping during the past 50 years imply a gradual increase in noise levels from shipping traffic. This relationship is complicated, however, by technology changes that have resulted in quieter ships during the same period (National Research Council 2003). Puget Sound experiences a concentration of commercial shipping in and out of United States ports, with the ports of Seattle and Tacoma collectively representing 9 percent of 20-foot-equivalent container traffic in 2003 (United States Army Corps of Engineers 2004). The OCNMS has designated a large portion of the project area as an area to be avoided. Under this voluntary ship traffic management program, vessels are advised to stay clear of this area if they carry cargoes of oil or hazardous materials or if they exceed 1,600 gross tons (Section 3.1.1.1.3, Current Issues, Area to be Avoided, for more information).

[9] Relative sound intensities (i.e., decibel values) in water are not directly comparable to relative sound intensities in air. This is primarily because the reference intensities used to compute sound intensity are different in water and air. A standard reference intensity must always be used when comparing relative intensities to one another. For underwater sound, the intensity of a sound wave with a pressure of 1 microPascal at 1 meter from the source point is used as the reference intensity. In air, however, the reference intensity is 20 microPascals at 1 meter.

Owing to the physics of underwater sound propagation, small vessels do not contribute substantially to ocean ambient noise on a global scale, but they may be important local sound sources in coastal areas. In 2000, approximately 210,000 motor boats were licensed in Washington State (Washington Interagency Committee for Outdoor Recreation 2002), with the majority likely operating near heavily populated areas surrounding Puget Sound. The National Research Council (2003) lists scientific vessels operating in a given area for days with stops and starts driven by data collection needs as a source of 160 to 190 dB. Received sound levels for whale-watching boats measured at approximately 91 meters ranged up to 127 dB across a broad band of frequencies (315 to 2,500 Hz) (Au and Green 2000). Erbe (2002) documented increased sound levels for high-speed operation. Small powerboats may have peak sound intensities of 145 to 150 dB in the 350 to 1,200 Hz band (Barlett and Wilson 2002). Fishing vessels also have moderate sound levels. According to Figure 3-12, vessel traffic associated with commercial and recreational fishing is heaviest and, therefore, probably loudest, from May to August in the project area.

3.12 Aesthetics

3.12.1 Introduction

This section discusses aesthetics as visual resources associated with the project area, a place where the Pacific Ocean, beaches, rocky tidepools and headlands, and adjacent forested wilderness meet. In the designation documentation for the OCNMS, Congress described the area as “one of the more dramatic natural wonders of the coastal United States, paralleling the majestic splendor of such terrestrial counterparts as Yosemite National Park and the Grand Tetons,” (50 FR 24586, 24604, May 11, 1994). Key visual resources in the project area include natural landscapes and seascapes, wildlife, and tangible cultural resources and historic artifacts.

Peoples’ opportunities to view past and proposed Makah whale-hunting activities in the project area are described by detailing access points where hunting and landing of a whale might be seen. Annual numbers of visitors and primary seasons of viewing are also described. Because whale hunts would take place offshore, and because the Makah practice exercises in 1998 and hunts in 1999 and 2000 were highly covered and televised events, most opportunities for viewing the hunt and hunt-related activities would occur through the media, including newspapers and television. For this reason, this section also describes media coverage of the previous hunts, along with public response to that coverage.

3.12.2 Regulatory Overview

As noted in Section 3.1, Geographically Based Management in the Project Area, several federal and tribal managed areas occur and overlap within the project area. These include the Olympic Coast National Marine Sanctuary, the Washington Islands National Wildlife Refuges, the coastal strip of the Olympic National Park, and the Makah and Ozette Indian Reservations (Figure 1-1). Because of their proximity to the project area, these management areas provide possible vantage points to whaling activities under each of the alternatives. The laws and regulations governing the management of these areas include recognition of the importance of aesthetic resources. In some cases, specific policy or management documents expand upon the aesthetic qualities that lend importance or value to the managed areas.

The National Marine Sanctuary Act, and NOAA's implementing regulations under which the Olympic Coast National Marine Sanctuary is designated and managed, include aesthetic values as important to the sanctuary concept. Sanctuary resources are defined as "any living or nonliving resource that contributes to the conservation, recreational, ecological, historical, educational, cultural, archeological, scientific, or aesthetic value of the Sanctuary," (16 USC 1432(8), 50 CFR 922.3). Section 3.1.1.1, Olympic Coast National Marine Sanctuary, describes the multiple-use nature of the Sanctuary, NOAA's regulations establishing prohibitions on certain uses of the Sanctuary, and the biological and historic characteristics of the Sanctuary that give it particular value as identified by the OCNMS designation document. Aesthetic resources of the Sanctuary that give it particular value include its remoteness, its undeveloped character, and its marine life, as well as tangible, historical resources including Indian village sites, ancient canoe runs, petroglyphs, and Indian artifacts (59 FR 24586, 24604, May 11, 1994; NOAA 1993).

The National Park Service Organic Act, governing the management of all national parks including the Olympic National Park, states that the fundamental purpose of national parks is "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC 1). The National Park Service has not developed a visual resource policy or management system for public lands under its jurisdiction; however, the overriding management purpose in a park is preservation of all significant resources, including the scenery (National Park Service 1996). Both the National Park Service and Ecology manage the aesthetics of the shoreline under federally granted Coastal Zone Management Act authority. The Coastal Zone Management Act identifies beaches as aesthetic resources of the nation (16 USC 1451(b)). Washington State's Shoreline Management Act establishes a program to coordinate the protection and development of the state's shoreline, preserving to the greatest extent possible the public's opportunity to enjoy the physical and aesthetic qualities of state natural shorelines (RCW 90.58.020). The Makah Tribe also has a coastal zone management plan for reservation shorelines.

Approximately 70 percent of Olympic National Park's coastal strip, including 36,000 acres mostly north of the Hoh River, is designated as wilderness (National Park Service 2008). Under the Wilderness Act of 1964 (Public Law 88-577), wilderness areas are managed for the "preservation of their wilderness character" for current and future generations of Americans (16 USC 1131). Both natural and cultural resources are contributing elements to the Olympic National Park Wilderness (National Park Service 2008). The principles applied to federal wilderness areas also apply to management of the Washington National Wildlife Refuges, which are all designated as wilderness areas, except for Destruction Island in the Quillayute Needles National Wildlife Refuge. Other protective regulations are described in Section 3.1.1.2, Washington Islands National Wildlife Refuges. Reservation lands along the shoreline around Cape Flattery are also designated wilderness.

Living marine resources within the project area, including but not limited to whales and other marine mammals, are also protected by federal and state statute and regulation as aesthetic resources. The Whaling Convention Act, for instance, includes the finding that whales are a unique marine resource of great aesthetic and scientific interest to mankind and notes that the protection and conservation of whales are of particular interest to citizens of the United States (16 USC 916 note, Public Law 96-60, Aug. 15, 1979). The MMPA also includes the congressional finding that "marine mammals have proven themselves to be resources of great international significance, aesthetic and recreational as well as economic" (16 USC 1361(6)).

3.12.3 Existing Conditions

The following sections describe the key visual resources in the project area, vantage points into the Makah U&A, and estimates of the number of visitors to these areas every year. Following the discussion of potential direct viewing opportunities is a summary of media coverage of previous hunts.

3.12.3.1 Visual Resources in the Project Area

The sea stacks, pillars, and islands that make up the Washington Islands National Wildlife Refuges within the Olympic Coast National Marine Sanctuary are a visual resource of statewide significance, representing the remote and rugged nature of the Olympic Peninsula's coastline

(FWS 2007). The islands rise out of the ocean in a variety of shapes and forms and are varying distances from the shoreline; formations in the foreground often appear as flat-topped cliffs rising out of the water, while formations in the background appear as clusters of often fog-shrouded stacks (FWS 2007). Many of the islands have vegetation, including small trees and shrubs, particularly the larger islands (such as Ozette Island). Other smaller islands have extensive steep grassy slopes or vegetated ledges (FWS 2007). The islands also provide views of hauled-out sea lions and harbor seals, migrating and feeding gray whales, minke whales, and sea otters, among other species (Section 3.5.3.1.2, Common Species off Washington Coast). Many species of seabirds are visible in the marine waters, off the coastal headlands and islands, and along the shore, including raptors, gulls, cormorants, common murres, petrels, auklets, and puffins, among others (Section 3.5.3.2.1, ESA-Listed Species, and Section 3.5.3.2.2, Non-Listed Marine Birds and Their Associated Habitats, for more information on marine birds that occur in the project area).

In the Olympic National Park, more than 650 archaeological sites document 10,000 years of human occupation, while historic sites reveal clues about the 200-year history of exploration, homesteading, and community development in the Pacific Northwest (National Park Service 2008). Maritime archaeological sites include stratified shell midden deposits and petroglyph sites and represent one of the Olympic National Park's most important and threatened classes of archaeological resources. Threats include coastal erosion and visitor use. Past mitigation at these areas has included excavation, bank stabilization, and revegetation (National Park Service 2008). Public education and interpretation, coupled with increased monitoring and ranger patrols, aims to curb the impacts of visitation and tidal debris on the coastal petroglyph sites, particularly at Wedding Rocks, a site on the beach near Cape Alava (National Park Service 2008).

3.12.3.2 Vantage Points and Viewing Opportunities

Visitors can view the portion of the Makah U&A in the Strait of Juan de Fuca from the land by vehicle at several locations along Highway 112, including the towns of Sekiu, Clallam Bay, and Neah Bay. In contrast, vehicle-based viewing opportunities for the Pacific coastal portion of the U&A are limited to a few sites on the Makah Reservation, mostly in the Sooes and Hobuck Beach area of Makah Bay. No roadways offer views of the southern portion of the Makah U&A. The La Push/Rialto Beach area is approximately 8 miles south of the Makah U&A. The only scenic driving opportunity along the coast of the Olympic Peninsula is an 8-mile stretch of United States Highway 101 in the Kalaloch area, which is more than 30 miles south of the Makah U&A (National Park Service 2008).

Most of the land-based viewing access in the project area is from hiking trails and beaches (where camping opportunities exist), including the Cape Flattery Trail and Hobuck and Sooes Beaches on the Makah Reservation. The Olympic National Park also provides hiking and backpacking access to 50 miles of beaches with views of the islands. The Ozette/Shi Shi portion of the Olympic National Park, including the Point of Arches, is the most visible and photographed place in the Olympic National Park coastal strip. Many visitors also access the beach for 2.9 miles of the 9-mile Cape Alava and Sand Point Trails on the Ozette Indian Reservation (National Park Service 2008).

Part of the Makah U&A is visible to OCNMS visitors. NOAA (2006) reports that more than 3 million people visit the north Washington coast every year, drawn by the beautiful scenery and the pristine wilderness, as well as opportunities to view wildlife and challenge themselves in a natural environment. Similarly, the Olympic National Park has attracted an average of 3.2 million recreation visitors a year since 1990, mostly from June through September and peaking in July and August (National Park Service 2008). Hiking and boating trips provide viewing opportunities to the Makah U&A.

In 2005 and 2006, the Makah interpreters hosted more than 15,000 visitors on the Cape Flattery Trail. They addressed coastal issues, Makah culture, and natural history within the area (NOAA 2006). In 2004, the Makah interpreter recorded an average of 169 visitors per day in July, 189 visitors per day in August, and 93 visitors per day for September. An estimated 5,000 to 7,000 people annually attend Makah Days in Neah Bay. This is a celebration of Makah identity and features a parade, street fair, canoe races, children's races, traditional dancing, a salmon bake, and fireworks (Tizon 1998a).

Previous authorized hunts in 1999 and 2000 occurred within the Makah U&A and OCNMS, along and adjacent to the coastal area of the Olympic National Park. Whale hunting activities were visible from Ozette Island, Cape Alava, and Sand Point to Father and Son Rock, the Point of the Arches, and Spike Rock near the Ozette Reservation and Shi Shi Beach (Gosho 1999) (Section 1.4.2, Summary of Recent Makah Whaling — 1998 through 2007, for more information about the locations of the 1999 hunt). People on trails and beach vantage points of the Olympic National Park may have viewed the hunts, including the May 17, 1999, killing of a gray whale. The possibility that some viewers were caught unaware is extremely unlikely because May is not a peak visitor month, the hunts were well-advertised in the media, and the weather conditions were poor (Gosho 1999) at least some of the time. People on the shores of Neah Bay on the

Makah Reservation could view the whale being towed to shore and flensed. These activities were also visible to protesters, enforcement personnel, and tribal members in vessels surrounding the hunts. Most of those viewing the whaling activities on the shore within the Makah Reservation were tribal members who supported the hunt and had favorable reactions. As reported by the *Seattle Times*, Makah Tribe members in Neah Bay considered the visual effects of the hunt as ". . . cause for celebration, a triumphant embrace of tradition and heritage, a culture's central symbol giving itself up for the kill" (Sorensen 1999).

During the May 1999 whale hunts, news reports indicate that vehicular access to State Route 112 paralleling the Strait of Juan de Fuca was blocked by protesters and tribal police for about 2.5 hours (Mapes and Solomon 1999a). Such blockages may have interrupted access to visual resources on the Olympic Peninsula. Traffic volumes on the land were otherwise normal (Section 3.13.3.1.2, Vehicle Traffic Patterns During the 1999 Hunt).

3.12.3.3 Media Coverage of Previous Authorized Hunts

The practice exercises, whale hunts, and associated protest activities that occurred in 1998, 1999, and 2000 were the focus of intensive media coverage in the region, including Seattle. In late summer and autumn of 1998, approximately 50 representatives of media organizations from all over the world arrived at Neah Bay to watch the Makah Tribe hunt whales (Mapes 1998a). Media coverage became an issue during the Makah Days celebration in August 1998, when its representatives crowded in front of tribal dancers, disrupting the formal welcoming ceremony (Clarridge 1998). From June 1998 to June 1999, whale-hunt-related news stories abounded in local newspapers. The *Seattle Post-Intelligencer* published 77 news items and three editorials on the topic during that period. The *Seattle Times* published 76 news items, 11 columnists' commentaries, and eight editorials during the same timeframe. Such intense attention was largely limited to the region, however. During the same period, the *New York Times* published 16 news items with the words 'Makah' and 'whale,' the *Los Angeles Times* published 13 related news items, and the *Washington Post* published three related news items.

Media coverage resumed when the Makah resumed hunting activities in April of 2000, but with less intensity than for prior hunts. Between April 1 and December 31, 2000, the *Seattle Post-Intelligencer* published 13 news items and one editorial about the hunt, protests and protesters, and associated legal actions. The *Seattle Times* published 15 news items and one editorial on hunt-related topics during the same period. As before, the hunt received considerably less attention outside of the Pacific Northwest. The *New York Times* published two hunt-related news items from April through December of 2000, the *Los Angeles Times* published four, and the *Washington Post* published a single hunt-related news item.

News of the Makah Tribe's successful hunt on May 17, 1999, received attention in local print and broadcast media. Locally, the Seattle *Post-Intelligencer* printed five photographs showing the whale in the water or on the beach; the *Seattle Times* printed four photographs, and the *Peninsula Daily News* printed seven photographs. At least two local television stations, KING-TV and KOMO-TV, sent helicopters to collect video footage of the hunt and subsequent activities. KING, KOMO, and KIRO-TV all extended their morning news shows to cover the story of the successful hunt, which occurred shortly before 7 a.m. (Levesque 1999). KCPQ, which did not have a morning news show at that time, interrupted regular programming with occasional updates. Northwest Cable News network, a sister station of KING-TV, ran near-constant footage and commentary on May 17, and 10 hours of live broadcast of the previous day's unsuccessful hunt (Levesque 1999; McFadden 1999).

Nationwide, the story of the successful hunt received considerably less attention. Most newspapers simply published the Associated Press wire story. There was no international Web site coverage by well-known news sources such as the *London Times*, *Le Monde*, *Asahi Shimbun*, and the *Japan Times* (Barber 1999). The story was broadcast on nationwide television, however, accompanied by commentary by Peter Jennings, ABC Network, and Tom Brokaw, NBC Network. Some observers characterized the images of the dying and dead whale as brutal and suggested that footage of the whale killing would pose a public relations problem for the Makah Tribe (Sorensen 1999).

Local newspaper reader response to the hunt was substantial. The *Seattle Times* received nearly 500 letters on the topic during the latter half of May 1999, nearly one-third of the total number of letters received for that month (Anderson 1999). On the day following the successful hunt, the *Seattle Post-Intelligencer* received more than 50 e-mail messages and more than 100 telephone calls voicing opinions about the hunt (Barber 1999). The *Peninsula Daily News* also reported an unusually large volume of letters and devoted a special letters page to the topic on the Friday following the hunt (Brewer 1999). KING-TV reported that the issue generated three or four times the normal volume of phone calls and e-mail messages related to a news story (Levesque 1999).

The news director at KIRO-TV chose not to broadcast images of the actual killing of the whale because some viewers had said they did not want to see explicit footage (Levesque 1999). Nearly all public response focused on the issue of killing the whale. Only a few comments offered reactions to images of the event, for example, "I can't believe you think most of the population in Western Washington is remotely interested in viewing the graphic video" (Levesque 1999).

The *Seattle Post-Intelligencer* published excerpts of some telephone and e-mail messages received in response to their coverage of the whale hunt (*Seattle Post-Intelligencer* 1999). While most responses expressed support for or protest against the hunt, some included reactions to published images. One commenter expressed disgust at the image of Makah whalers jumping on the carcass of the whale. Another stated that the hunt of a whale should not be broadcast on television. One letter to the editor read "tonight I refuse to watch any news program for fear I will see another replay of the Makah hunt" (*Seattle Post-Intelligencer* 1999).

Of more than 30 letters published in the *Peninsula Daily News* on Friday, May 21, two contained reactions to images of the hunt. One writer described the television footage as "the most disgusting sight" she had ever seen. Another expressed the opinion that the graphic coverage should prompt viewers to express their objections to their congressional representatives (*Peninsula Daily News* 1999).

A Google search indicated about 710 instances of media coverage in the 20 days following the September 8 unauthorized hunt, the majority in the first few days afterward. Media outlets all over the country reported the event, often using Associated Press information. Follow-up coverage included reports on the Tribe's apology and trip to Washington, DC. The *Los Angeles Times*, *Washington Post*, and *New York Times* each ran one or two stories. Most of the coverage emanated from western Washington media. Seattle TV stations provided live reports from Neah Bay for the first few days. The *Seattle Times* had the most extensive coverage, with Lynda Mapes writing several in-depth articles. The *Times* also asked for reader feedback; 93 comments with a wide range of views were posted in response. The *Seattle Post-Intelligencer* and Port Angeles *Peninsula Daily News* ran multiple stories about the kill and activities following it. Other regional media had less extensive coverage. As news interest waned, there were several editorials and opinion pieces published, also with a wide range of views expressed.

Some anti-whaling Websites that were active during the earlier authorized hunts are no longer in existence or are not current. The Humane Society of the United States., Whale Police, Sea Shepherd, and Animal Welfare Institute posted press releases on their Websites condemning the September 8 whale kill. The few blogs covering this issue linked to or extracted from various media reports on the Internet, with limited commentary. Views seemed to be about equal between condemnations of the kill and of whale-hunting in general, and support for tribal rights and culture.

3.13 Transportation

3.13.1 Introduction

The following section documents several transportation-related issues pertaining to the Makah whale hunt. Transportation resources near Neah Bay include federal and state highways, marine vessels, and airports. Key parameters for analysis include the patterns of highway, marine vessel, and air traffic near Neah Bay.

3.13.2 Regulatory Overview

At the federal level, the Federal Highway Administration within the Department of Transportation is responsible for the management of the national highway system, which includes United States Highway 101 near Neah Bay (23 USC 101). The national highway system consists of interconnected urban and rural principal arterials and highways that serve major population centers, international border crossings, ports, airports, public transportation facilities, other intermodal transportation facilities, and major travel destinations; meet national defense requirements; and serve interstate and interregional travel (23 CFR 470A).

The Federal Highway Administration is responsible for stewardship and oversight of the federal-aid highway funds allocated to Washington State. The Washington State Department of Transportation is the state agency responsible for delivering these federal-aid funds. Under the Statewide Multi-Modal Transportation Plan (RCW 47.06), the Washington Department of Transportation is responsible for developing a statewide multi-modal transportation plan in conformance with federal requirements. The highway system includes both state and federal highways.

In the marine environment, the Washington State Department of Transportation has the responsibility to oversee the national transportation system, which includes the marine transportation system (49 USC 101). The Coast Guard is responsible for enforcement and administration of laws governing vessels, cargo, and passengers. The Coast Guard has established a permanent RNA along the northwestern Washington coast and in a portion of the entrance to the Strait of Juan de Fuca (33 CFR 165.1301). Within the RNA, a moving exclusionary zone restricts the movements of vessels near a Makah vessel that is actively engaged in a whale hunt. Coast Guard restrictions for marine vessels engaged in whale hunting activities are described in greater detail in Section 3.1.1.3, Coast Guard Regulated Navigation Area, and Section 3.15.2.1, Vessel Safety Regulations and Authorities.

The International Maritime Organization has designated a formal area to be avoided for the OCNMS. Vessels advised to stay clear of this area include all ships and barges carrying cargoes of oil or hazardous materials and all ships 1,600 gross tons and larger (Section 3.1.1.1.3, Current Issues, Area to be Avoided, and Section 3.2.3.3, Spill Prevention).

Air traffic safety is the responsibility of the Federal Aviation Administration. In addition, regulations for the management of the OCNMS prohibit flying motorized aircraft less than 2,000 feet above certain portions of the Sanctuary (Section 3.1.1.1.2, Designation and Regulatory Overview [OCNMS]). These include all areas within 1 nautical mile of the coastal boundary of the sanctuary, as well as areas within 1 nautical mile of any of the islands that constitute the Flattery Rocks, Quillayute Needles, or Copalis NWRs (15 CFR 922.152). These prohibitions do not apply to activities in response to emergencies threatening life, property, or the environment, or those for valid law enforcement purposes.

3.13.3 Existing Conditions

3.13.3.1 Highway Vehicle Traffic

Primary access to the isolated community of Neah Bay is via State Route 112, a narrow, winding highway that parallels the Strait of Juan de Fuca through rolling, forested terrain. An alternative route is along the closest primary highway, United States Highway 101, to Sappho and then north on a separate highway (State Route 113) that ends at State Route 112 (Figure 3-2). In recognition of its outstanding scenic, recreational, and cultural qualities, State Route 112 has been designated as a national scenic byway by the United States Secretary of Transportation.

3.13.3.1.1 Typical Vehicle Traffic Volume Patterns

The Washington State Department of Transportation conducts traffic counts occasionally on State Route 112 at the boundary of the Makah Reservation. The most recent traffic counts were conducted in 2001 and 2004. Annual average daily traffic volumes at that location were 940 vehicles and 1,200 vehicles, respectively (Washington Department of Transportation 2005a).

The closest permanent, full-time automated data collection station is located on United States Highway 101, near the State Route 113 turnoff to Neah Bay. Data from this station provide an indication of highway traffic patterns and trends near Neah Bay. Daily traffic counts at that station vary with the day of the week, with Fridays typically 10 percent higher than average and Sundays 10 percent below average (Washington Department of Transportation 2005a). In addition, traffic counts show a strong pattern of seasonal variability, with the highest daily averages occurring during the summer months and the lowest occurring in winter. Although actual values vary from year to year, the overall pattern remains consistent (Table 3-37, Figure 3-11).

Visitation data for the Cape Flattery Trail and the Makah Museum may serve as indirect indicators of the amount of vehicle traffic on the Makah Reservation. In 2004, a natural resource interpreter at the Cape Flattery Trail recorded visitor numbers in July, August, and September. The interpreter was present from roughly noon until 6:00 p.m.; visitors who arrived before and departed after the counting period were not counted, so these data represent an underestimate of actual visitation. Based on these data, the trail received an average of 169 visitors per day in July, 189 per day in August, and 93 per day in September (Bowechop 2005b). More than 60 percent of the annual visitors to the Makah Cultural and Research Center/Makah Museum arrive during June, July, and August (North Olympic Peninsula Visitor and Convention Bureau 2005c). Additional information about tourist visitation to the Makah Reservation can be found in Section 3.6.3.2.4, Contribution of Tourism to the Local Economy.

3.13.3.1.2 Vehicle Traffic Patterns During the 1999 Hunt

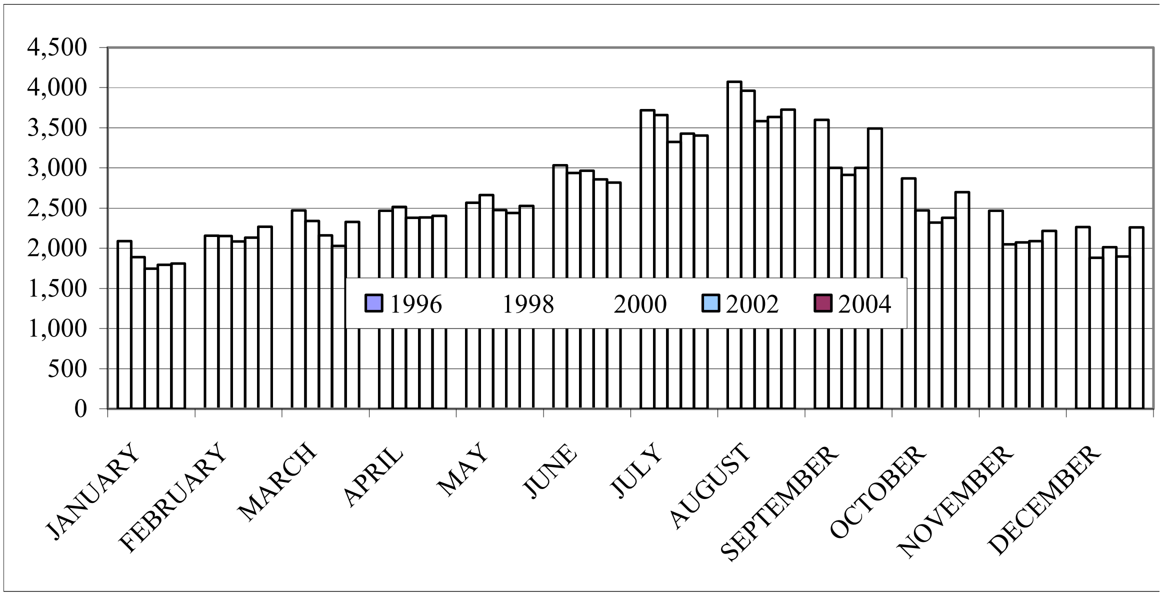
News accounts of the 1998-1999 whale hunts described one occasion on which highway traffic was affected by activities associated with the hunt. Two days before the successful hunt on May 17, 1999, traffic on State Route 112 was stopped for approximately 2.5 hours after the highway was blocked by protesters and tribal police (Mapes and Solomon 1999a). No other highway blockages are described in news accounts or law enforcement records from the previous hunt, although Coast Guard records mention the occurrence of weekly protests on State Route 112 at the Makah reservation boundary (United States Coast Guard 1999c). See Section 3.14.3.2, Police, for a discussion of traffic stops near Neah Bay.

Automated traffic count data Highway 101 for the month of May 1999 do not indicate any anomalous spikes in traffic volume during the days surrounding the events of May 17, 1999. Traffic volume data for that date, along with May 22, the date of the Tribe’s celebration of the successful hunt, are denoted in bold font in Table 3-38. Two trends are evident in the data. First is a steady increase in traffic volumes throughout the month, peaking on Memorial Day weekend (May 31). Second is the weekly pattern described above, wherein Friday volumes typically exceed those on Sundays. This pattern is evident in the data from the months of May 1998, 1999, and 2000; Friday volumes typically exceed those of the subsequent Sunday by at least 15 percent (Washington Department of Transportation 2005b)

TABLE 3-37. AVERAGE WEEKDAY TRAFFIC COUNTS ON HIGHWAY 101 NEAR STATE ROUTE 113, 1995 TO 2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
January	1,987	2,088	2,153	1,889	2,064	1,746	1,993	1,793	1,865	1,809
February	2,052	2,158	2,417	2,152	1,972	2,084	2,047	2,133	2,117	2,266
March	2,587	2,472	2,286	2,338	2,323	2,159	2,236	2,030	2,097	2,329
April	2,715	2,466	2,365	2,516	2,245	2,380	2,289	2,383	2,282	2,402
May	3,234	2,565	no data	2,663	2,572	2,477	2,409	2,439	2,402	2,527
June	3,730	3,032	no data	2,939	2,984	2,967	2,821	2,857	2,829	2,818
July	3,988	3,720	no data	3,657	3,584	3,323	3,409	3,426	3,366	3,403
August	3,379	4,072	no data	3,962	3,838	3,582	3,722	3,635	3,626	3,728
September	2,787	3,600	no data	3,000	2,401	2,915	3,040	3,003	2,922	3,490
October	2,363	2,870	no data	2,473	2,299	2,320	2,401	2,381	2,304	2,698
November	no data	2,466	no data	2,049	2,114	2,073	1,979	2,087	2,108	2,217
December	no data	2,265	no data	1,883	2,103	2,012	1,867	1,896	2,079	2,259
Annual Average	**N/A**	**2,784**	**N/A**	**2,633**	**2,566**	**2,535**	**2,573**	**2,542**	**2,515**	**2,665**

Source: Washington Department of Transportation 1997, 1999, 2000, 2001, 2002b, 2003, 2004, 2005a, 2005c.



Source: Washington Department of Transportation 1997, 1999, 2001, 2003, 2005a.

Figure 3-11. Average Weekday Traffic Counts on Highway 101 Near State Route 113, 1996 to 2004

TABLE 3-38. DAILY TRAFFIC COUNTS ON HIGHWAY 101 NEAR STATE ROUTE 113, MAY 1999

WEEK NUMBER	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1							2,340
2	2,002	2,376	2,393	2,420	2,382	2,618	2,422
3	2,143	2,432	2,458	2,486	2,530	2,764	2,558
4	2,318	2,465	2,502	2,635	2,680	3,159	3,221
5	3,161	2,994	2,647	2,782	2,954	3,431	3,446
6	3,569	3,150					

Source: Washington Department of Transportation 2005b.

Note: Bold font indicates the dates of the successful hunt (May 17, 1999) and the subsequent celebration (May 22, 1999).

This pattern does not hold true on Memorial Day weekends, when Sunday volumes can approach or even exceed those of the preceding Friday. The only other exception to this pattern occurs during the weekend of May 21 to 23, 1999, when Sunday traffic exceeded traffic on the preceding Friday, although barely. This anomaly may be attributable to many factors, such as weather, and may also reflect trips by participants attending the May 22 feast and celebration.

3.13.3.2 Marine Vessel Traffic

Marine vessels that travel to Neah Bay may find moorage at the Makah Marina, where more than 200 fishing vessels (commercial and recreational) and pleasure craft can anchor. In addition, several thousand large vessels pass by Neah Bay each year on their way through the Strait of Juan de Fuca to ports in Canada and the United States.

3.13.3.2.1 Fishing Vessel Traffic

The amount of marine vessel traffic associated with commercial fishing activity can be estimated by counting commercial fish tickets for vessels that land at the Neah Bay Marina. Both tribal and non-tribal fishers are required by law to complete a fish ticket when they land their catch. Rarely, catch from a single trip might be listed on two tickets. In other cases, a vessel may engage in day-fishing trips for several days and then make a single landing. Statistically, these two circumstances offset one another and do not occur frequently enough to affect the overall total counts (Culver 2005).

Estimates of vessel traffic associated with recreational fishing are based on vessel counts conducted by the Washington Ocean Sampling Program. Between mid-April and October, sport fishing vessels are counted either leaving the port (between 4:30 a.m. and the end of the day) or entering the port (between 8:00 a.m. and dusk). Due to a processing error, no data are currently available for 2002 (Culver 2005).

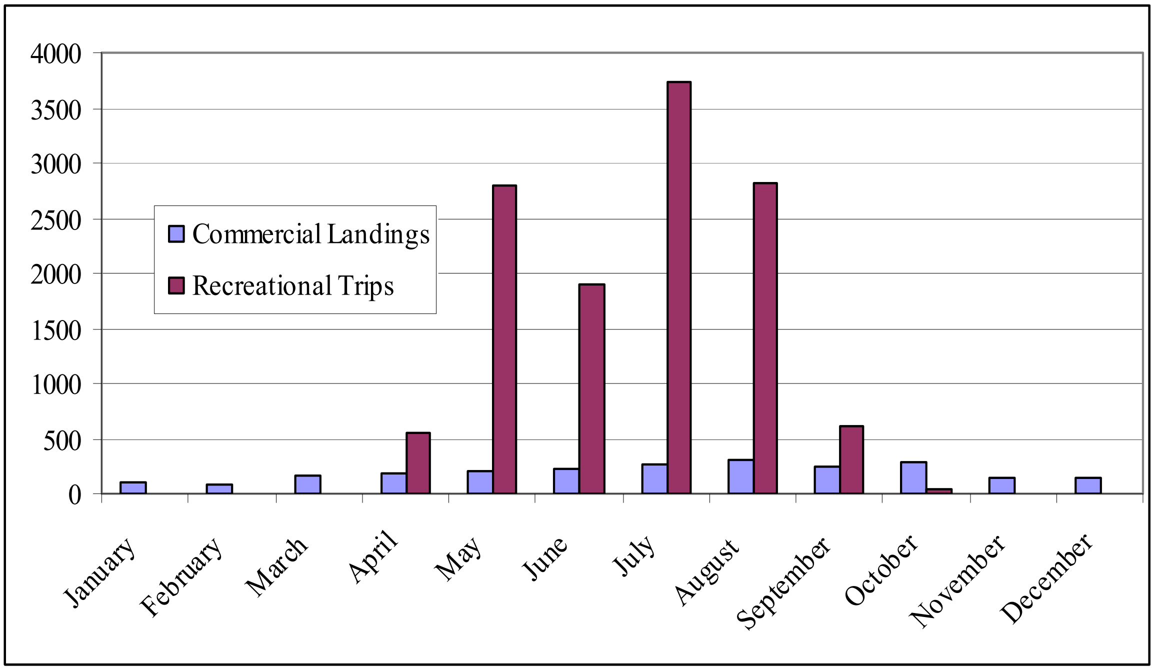
Between 1997 and 2004, total boat trips at Neah Bay showed an average annual increase of approximately 6 percent Table 3-39). Most vessel traffic at Neah Bay is associated with recreational trips, which account for at least 80 percent of all boat trips in all years. In most years, the peak of recreational fishing activity occurs in the month of July (salmon fishing season), with a secondary peak during the halibut season in May (Figure 3-12). Recreational fishing trips decrease dramatically in September, and commercial trips exceed recreational trips by October (WDFW 2005c; WDFW 2005d). On average, approximately 83 percent of all boat trips (commercial and recreational) occur during the months of May, June, July, and August. The five-month period from November to March accounts for less than 5 percent of all trips. Five percent of all trips occur in April, 6 percent in September, and 2 percent in October.

TABLE 3-39. RECREATIONAL FISHING BOAT TRIPS AND COMMERCIAL FISHING VESSEL LANDINGS AT NEAH BAY, 1997 TO 2004

	1997	1998	1999	2000	2001	2002	2003	2004
Recreational Trips	10,519	11,633	10,909	12,057	13,062	NA[1]	13,396	15,388
Commercial Landings	2,517	1,950	2,335	1,833	2,170	2,414	2,711	2,945
TOTAL	**13,036**	**13,583**	**13,244**	**13,890**	**15,232**	**NA**	**16,107**	**18,333**

[1] No recreational fishing trip data are available for 2002.

Source: WDFW 2005c, 2005d.



Source: WDFW 2005c, 2005d.

Figure 3-12. Average Monthly Levels of Marine Vessel Traffic at Neah Bay, 1997 to 2004

3.13.3.2.2 Offshore Vessel Transits

Ecology produces annual reports of the number of entering transits by various vessel types. An entering transit is defined as the passage of a vessel from sea or from Canadian waters into Washington State waters, regardless of destination (Ecology 2005a). The data collected by the department identify commercial fishing, cargo, and passenger vessels 300 gross tons and larger, as well as tank ships and tank barges transporting oil of any tonnage. Entering transits at the Strait of Juan de Fuca provide a measure of the amount of marine traffic near the Makah Tribe's U&A. From 2002 to 2004, Ecology reported roughly 4,500 to 4,700 entering transits annually via the

Strait of Juan de Fuca (Table 3-40). This averages to approximately 12 to 13 large vessels per day, with cargo and passenger vessels comprising more than 80 percent of entering transits. Personnel at the Canadian Coast Guard's Tofino Station have observed very little seasonal variability in traffic volume, except in the case of fishing vessels (Smolders 2005).

TABLE 3-40. VESSEL TRANSITS USING THE STRAIT OF JUAN DE FUCA, 2002 TO 2004

VESSEL TYPE AND DESTINATION	2002	2003	2004
Cargo and Passenger Greater than 300 Gross Tons			
Washington Port	1,724	1,699	1,462
Canadian Port	2,193	2,303	2,231
Tank Ships and Barges			
Washington Port	529	567	596
Canadian Port	60	55	66
Commercial Fishing			
Washington Port	45	35	18
Canadian Port	85	23	5
Factory Fishing			
Washington Port	69	69	79
Canadian Port	1	1	29
TOTAL	**4,706**	**4,752**	**4,486**

Source: Ecology 2003b, 2004, 2005a.

The Tofino Station provided an estimate of approximately 40 to 50 vessel transits per day in the Strait of Juan de Fuca (entering and leaving), which equates to 20 to 25 entering transits. Based on a comparison of this estimate with the values reported by Ecology, approximately half of the daily transits are vessels less than 300 gross tons and not transporting oil.

3.13.3.2.3 Marine Traffic During the Previous Hunt

In the fall of 1998, as the Makah Tribe attempted to implement the first season of its hunt, several protest vessels began a two-month occupation of Neah Bay to prevent the taking of a whale. From late September to late November, more than 15 protest vessels trailed any boat that left the Neah Bay marina (Dark 1999). Most of the protest vessels moored each night in Sekiu, a half-hour boat ride away (Mapes 1998a). The Sea Shepherd Conservation Society anchored the 180-foot *Sea Shepherd III* and the 95-foot cutter *Sierenian* outside Neah Bay and publicized plans to use a 27-foot former Norwegian military submarine painted to resemble a full-grown orca whale (Mapes 1998a; Tizon 1998b). The number of protest vessels was smaller when the hunt resumed the following spring; approximately a dozen boats returned to Sekiu (Mapes and Solomon 1999b).

3.13.3.3 Air Traffic

Three airports serve Neah Bay and the western portion of Clallam County. Closest to Neah Bay is the Sekiu Airport, approximately 20 miles east on Highway 112. The Washington Department of Transportation (2002a) provides an estimate of approximately 1,000 annual operations at the airport. The airport has a visual approach slope indicator system, which is a set of lights that provide visual descent guidance information during the approach to a runway.

The Forks area, approximately 30 air miles from Neah Bay (50 miles by highway), has two public access airports. The Forks Municipal Airport, located on the south edge of the City of Forks, has a 2,400-foot paved runway and receives approximately 13,550 annual operations (Washington Department of Transportation 2002a). The Coast Guard uses the airport as a refueling station for its helicopters. The airport is also used by emergency medical air transport helicopters that service the Forks Community Hospital (Newkirk and Casavant 2002). The Quillayute Airport is a former Naval Auxiliary Air Station located approximately 10 miles west of Forks. It receives approximately 450 annual operations (Washington Department of Transportation 2002a). Neither the Forks nor the Quillayute Airport has an approved instrument approach that would allow flights to proceed in most weather conditions (Newkirk and Casavant 2002).

Experience from the 1999 hunt indicates that media aircraft can operate at altitudes more than 2,000 feet above water. On the day of the successful hunt, three television news helicopters were present throughout the day; according to Coast Guard accounts of the day, the aircraft were very helpful and observed all safety precautions (United States Coast Guard 1999a). The only problem with aircraft occurred on one day in 1998 when a seaplane operated by protest groups made several passes lower than 2,000 feet over the area of the hunt. Operators of the aircraft were subsequently contacted by the Coast Guard, and the activity did not recur in 1999.

3.14 Public Services

3.14.1 Introduction

The following section documents several public-service-related issues pertaining to the Makah whale hunt. Key parameters for analysis include staffing and occurrence rates of incident responses for local law enforcement agencies, including the Coast Guard and police. Also included is a discussion of public health facilities near Neah Bay.

3.14.2 Regulatory Overview

No specific regulations pertain directly to the establishment or maintenance of public services in the project area.

3.14.3 Existing Conditions

3.14.3.1 Coast Guard

The Coast Guard maintains Station Neah Bay, a small boat station within the Makah Indian Reservation. The station is staffed by 32 active-duty personnel; equipment includes two 47-foot motor lifeboats and one 25-foot response boat (United States Coast Guard 2008). The station also features a helicopter landing pad with fueling facilities. The station's area of responsibility extends from the Strait of Juan de Fuca east to Pillar Point and south to Cape Alava. The station responds to approximately 100 search and rescue cases a year, primarily during the summer, when sports fishers and tourists are present in greatest numbers (United States Coast Guard 2004). The station's crew is also responsible for maritime law enforcement in the area, conducting approximately 200 safety boardings per year.

During the previous Makah whale practice exercise in 1998 and hunts in 1999 and 2000, Coast Guard personnel were responsible for ensuring the safety of persons and vessels near the hunt. To this end, the Coast Guard enforced an RNA and a 500-yard moving exclusionary zone around tribal vessels actively engaged in the hunt. This MEZ was designed to keep protesters, reporters, and spectators out of the area where life and property would face the greatest risk of endangerment from an injured or pursued whale or a round from a .50-caliber rifle. See Section 3.1.1.3, Coast Guard Regulated Navigation Area, and Section 3.15.2.1, Vessel Safety Regulations and Authorities for more information about operation of the RNA and MEZ in prior hunts. The Coast Guard used helicopters, a cutter, and several utility boats and Zodiacs to enforce the exclusion zone (Mapes and Solomon 1999b). In October and November of 1998, two additional 41-foot utility boats were made available, if needed, but no extra personnel were placed on duty (Mapes 1998d). In May 1999, the Coast Guard cited the operators of four protest boats for grossly negligent operations and/or MMPA take violations, and three of the vessels were taken into federal custody (NMFS 1999; United States Coast Guard 1999c; United States Coast Guard 1999d). In April 2000, a Coast Guard utility boat responded to a protest vessel that was violating the exclusionary zone around a Makah canoe engaged in the whale hunt. See Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007, and Section 3.15.3.4, Behavior of People Associated with the Hunt, for more details about protest activities.

3.14.3.2 Police

The Makah Tribal Police have jurisdiction over crimes and infractions committed by Native Americans from any tribe on reservation lands. In addition, the tribal police have the authority to detain non-Indians for violations of law occurring on the reservation until they can be turned over to the appropriate authority (county, state, or federal). See Section 3.1.2.1, Makah Tribal Departments and Agencies, for a description of the tribal police department and Section 3.1.2.2.1, Makah Public Safety Program, for a description of the Tribe's emergency management plan. In 2005, Makah Public Safety responded to emergencies in the following ways:

- Tribal dispatchers, including 911 calls, received 26,815 calls.
- Provided 341 ambulance transports, including transportation to outlying hospitals and response to local emergencies (including vehicular accidents).
- Took 3,330 police calls.
- Provided 341 ambulance transports, including transportation to outlying hospitals and responses to local emergencies (including vehicular accidents).

Non-tribal law enforcement activity in the area is conducted by the Clallam County Sheriff's Department, which has one sergeant and four deputies stationed at Clallam Bay. The patrol division of the Sheriff's Department is responsible for police patrols in all unincorporated areas of Clallam County, responding to calls for service made by citizens in need of police assistance, and actively seeking out crime and traffic offenders. The closest deputy lives approximately 20 to 30 minutes from Neah Bay, which would be the minimum amount of time required to respond to an unanticipated law enforcement need. The Washington State Patrol oversees traffic safety compliance on roads and highways in the area. Two state troopers patrol the northwestern portion of the Olympic Peninsula, from the western end of Lake Crescent to the Quinault Indian Reservation (George 2005a). This area includes approximately 70 miles of United States Highway 101; 70 miles of State Routes 110, 112, and 113; and numerous local and other roads.

In 2003 and 2004, the Clallam County Sheriff's Department conducted an average of approximately 150 traffic stops annually in the western portion of the county, including State Route 112 and Highway 101 west of Lake Crescent, neither of which are on the Makah Reservation. Approximately 15 percent of the calls for service received by the patrol division typically come from that part of the county, which has about 10 percent of the county's population (Snover 2005). The Sheriff's Department has not had to respond to any calls for disturbance of the peace or similar problems since 1999.

The Washington State Patrol has more-detailed data available for policing activities conducted by state troopers (Table 3-41). From 1997 to 2004, state troopers conducted an annual average of more than 1,000 traffic stops on the 36 miles of state and federal highway closest to Neah Bay. This area includes United States Highway 101 between Forks and the turnoff for State Route 113, State Route 112 west of Sekiu, and the entire length of State Route 113. The sharp increase in traffic stops on State Route 113 in 1999 could be related to the Makah whale hunt (George 2005b). In addition to conducting traffic stops, state troopers responded to an average of more than 50 collisions in this area each year. In most years, more than half of these collisions occurred on the 15-mile stretch of State Route 112 between Sekiu and the Makah Reservation boundary, which had an average annual rate of 1.8 collisions per mile. The corresponding rates for United States Highway 101 and State Route 113 were 1.5 and 0.9 collisions per mile, respectively.

A law enforcement task force was assembled to ensure public safety during the previous hunts in 1998, 1999, and 2000 (Section 3.15, Public Safety, for more information about the task force). The task force was prepared to deploy any combination of 14 law enforcement agencies, from the Clallam County Sheriff's Department to the Royal Canadian Mounted Police. Ships, boats, planes, helicopters, squad cars, and the National Guard were prepared to participate, if necessary. The task force prepared for a worst-case scenario of 15 days of police protection, costing $160,000 in overtime, equipment, and supplies (Mapes 1998d). Despite serious concern about conflicts between protesters and whaling supporters, the full strength of the task force was never needed.

TABLE 3-41. NEAH BAY AREA TRAFFIC STOPS AND COLLISIONS, 1997 TO 2004

	1997	1998	1999	2000	2001	2002	2003	2004
State Route 101 Mileposts 192-203								
Traffic stops	608	954	831	851	770	683	829	682
Collisions	20	14	15	21	20	15	16	9
State Route 112 Mileposts 0-15								
Traffic stops	139	184	103	91	75	61	78	103
Collisions	28	37	28	24	23	30	28	21
State Route 113 Mileposts 0-10								
Traffic stops	103	133	251	122	110	181	164	156
Collisions	10	9	13	7	10	12	4	4
TOTAL								
TRAFFIC STOPS	**850**	**1,271**	**1,185**	**1,064**	**955**	**925**	**1,071**	**941**
COLLISIONS	**58**	**60**	**56**	**52**	**53**	**57**	**48**	**34**

Source: Washington State Patrol 2005.

The Clallam County Sheriff's Department did not find that the hunt and associated activities imposed a substantial burden on department staff (Snover 2005). Particular concern preceded the celebration of Makah Days in August 1998. There were rumors that up to 20,000 anti-whaling demonstrators might attend to disrupt the tribal community festival. Washington Governor Gary Locke mobilized 800 members of the National Guard to ensure public safety. By the end of the festival weekend, there had been no demonstrations and few protesters (Mapes 1998d). The following year, $825,000 of the state general fund was allocated to reimburse costs associated with this activation (Washington State Senate 1999).

3.14.3.3 Local Medical Facilities

The Sophie Trettevick Health Center on the Makah Reservation has three permanent providers, who are Indian Health Service employees – two medical doctors and one nurse practitioner. The clinic focuses on primary care and has x-ray services and a pharmacy. The normal hours of operation are Monday through Friday, from 8:00 a.m. to 5:00 p.m. After-hours and emergency services are provided be emergency responders via 911 calls, 24 hours per day, seven days per week. Emergency response includes stabilization and transport to the closest appropriate facility. Airlift NW (Seattle) can be called in, and patient destination is determined by the emergency responder. If Airlift NW is not available, the Coast Guard may provide transport. For emergencies on the water, the Coast Guard is the responder.

Although the health clinic provides day-to-day care service to tribal members, it will treat anyone with life or limb-threatening injuries. Injured non-Indians patients are stabilized and transported to an appropriate facility. The clinic has a memorandum of agreement with the Coast Guard to provide services and with Clallam Bay Fire District 5 to provide mutual assistance in emergency situations. The clinic has a Comprehensive Emergency Management Plan (2005) that dovetails to the Makah Comprehensive Management Plan (Section 3.1.2.2, Makah Tribal Porgrams and Management Plans).

The closest 24-hour medical facility is the Forks Community Hospital, approximately 50 miles away. This is a Level 4 trauma care facility; patients with life-threatening injuries are stabilized and transported by Airlift Northwest or ambulance to more advanced trauma facilities, if necessary. The closest Level 3 trauma care facility (a facility with the resources for emergency resuscitation, surgery, and intensive care for most trauma patients) is at Olympic Medical Center in Port Angeles, 71 miles from Neah Bay and 58 miles from Forks. The closest Level 1-2 trauma care facility, which supports the full availability of specialists and can provide back-up resources for the care of exceptionally severe injuries, is Harborview Medical Center in Seattle, 120 air miles away.

3.15 Public Safety

3.15.1 Introduction

Aboriginal subsistence whale hunting is an inherently dangerous activity. The 2006 IWC Whale Killing Methods Workshop Report indicated, for example, that fatal accidents are not uncommon in Arctic aboriginal subsistence whaling hunts; between one and six people die annually in the Alaska and Chukotka Native hunts, combined (IWC 2007a). Five factors in the local environment may affect public safety: location of the hunt; weather and sea conditions; behavior of the targeted species (the gray whale); number and behavior of people associated with the hunt (including protesters); and hunting equipment, including vessels and weapons.

3.15.2 Regulatory Overview

3.15.2.1 Vessel Safety Regulations and Authorities

Any Makah whale hunt would occur within the EEZ of the United States, where the Coast Guard has enforcement authority over vessel safety under the Ports and Waterways Safety Act (33 USC 1221 et seq.). The Coast Guard has established an RNA in the Strait of Juan de Fuca and adjacent coastal waters of northwest Washington (33 CFR 165.1310) to enforce vessel activities near any Makah whale hunt and reduce the danger of loss of life and property from any hunt. See Section

3.1.1.3, Coast Guard Regulated Navigation Area, and Figure 3-1, for information about location of the RNA in relation to the project area. When the Coast Guard finalized the RNA after the 1999 hunt had occurred, it specifically found that "[t]he uncertain reactions of a pursued or wounded whale and the inherent dangers in firing a hunting rifle from a pitching and rolling small boat are likely to be present in all future hunts, and present a significant danger to life and property if persons or vessels are not excluded from the immediate vicinity of a hunt" (64 FR 61209, Nov. 10, 1999).

Within the RNA, a MEZ is activated when one Makah whale hunt vessel displays an international numeral pennant 5. The whale hunt vessel may be the canoe or the chase boat; the MEZ extends 500 yards around the vessel. The zone operates between sunrise and sunset, when surface visibility exceeds 1 nautical mile (33 CFR 165.1310(b)). The MEZ is deactivated upon sunset, when visibility is reduced to less than 1 nautical mile, or when the Makah hunt vessel takes down the international numeral pennant 5 (33 CFR 165.1310(b)). No person or vessel may enter the MEZ when it is activated, except for the authorized Makah whale hunt vessel, an authorized media pool vessel preauthorized by the Coast Guard, or another vessel or person authorized by the Coast Guard (33 CFR 165.1310(c)), such as the observer vessel. The authorized media pool vessel must maneuver to avoid positioning itself between whales and hunt vessels, out of the line of fire, at a prudent distance and location relative to the whale hunt operations, and in a manner that avoids hindering the hunt or path of the whale in any way (33 CFR 165.1310(f)(3)). The media pool vessel must operate at its own risk, but in accordance with safety and law enforcement instructions from Coast Guard personnel (33 CFR 1310(f)). The regulation does not affect normal transit or navigation in the RNA. The Makah whalers must provide specific broadcasts on a marine radio channel (Channel 16 VHF-FM), starting one half hour before they begin whale-hunting operations and continuing every half hour until hunting activities end. The broadcasts advise mariners of the 500-yard exclusion area and urge them strongly to remain even further away from whale hunting activities as an additional safety measure (33 CFR 1310(e)).

The Coast Guard's regulations are consistent with the International Maritime Organization's guidelines for preventing collisions at sea (1972 Convention on the International Regulations for Preventing Collisions at Sea) and meet the goals of IWC Resolution 2006-2. At the 58th Annual Meeting on St. Kitts, the IWC adopted Resolution 2006-2 on the Safety of Vessels Engaged in Whaling and Whale Research-related Activities, recognizing concerns about confrontations at sea and ports related to whaling activities. The IWC and contracting governments acknowledged the right to legitimate and peaceful forms of protest and demonstration, but agreed and declared that the IWC and contracting governments do not condone any actions that are a risk to life and property relative to confrontations related to whaling between vessels at sea.

3.15.2.2 Weapon Safety Regulations and Authorities

For Makah tribal members on the Makah Reservation or hunting in the Tribe's U&A, Title 10 of the Makah Law and Order Code, Weapons Control Ordinance, governs the possession and use of weapons. Adults may possess weapons on the reservation, provided that individuals do not carry their weapons with intent to assault another, do not threaten to use or exhibit weapons in a dangerous or threatening manner, and do not use weapons in a fight or quarrel (Section 10.5.01). Weapons also must not be concealed; loaded and carried in a vehicle on a public road; discharged from, upon, or across any public highway (Section 10.5.01); and not possessed or discharged in any closed area (Section 10.5.02). Juveniles from 16 to 18 years of age may possess weapons after completing a weapons training course and receiving a weapons safety certificate from the chief of the Makah Tribal Police (Section 10.2.01).

Under the proposed action and in the past hunts, the Makah Whaling Commission has also established certification guidelines and a certification process for whaling captains, harpooners, riflemen, divers, canoe paddlers, and other whaling team members. The guidelines and certification process ensure that every whaler has received adequate training to perform his assigned role on the team. Certification of riflemen includes a demonstration of proficiency and accuracy under simulated hunting conditions. Under the proposed action, and in past hunts under the 2001 Gray Whale Management Plan, the rifleman (onboard the Makah chase boat) cannot discharge a weapon until authorized to do so by a Makah safety officer (a diver or a Makah member also on board the Makah chase boat). There are three safety factors:

1. The safety officer has the authority to determine whether visibility is less than 500 yards in any direction, in which case the whaling captain suspends the hunt.

2. The safety officer would not authorize the rifleman to discharge the weapon unless the barrel of the rifle was above and within 30 feet or less from the target area of the whale.

3. The safety officer would determine whether the rifleman's field of view is clear of all persons, vessels, buildings, vehicles, highways, and other objects or structures that if hit by a rifle shot could cause injury to human life and property.

Off the Makah Reservation (including on the territorial sea), or for non-Indians on the Reservation, the laws of Washington State apply to weapon possession and use. The Revised Code of Washington (3.1 RCW 9.41.270(1)) contains the following language:

> [i]t shall be unlawful for any person to carry, exhibit, display, or draw any firearm, dagger, sword, knife or other cutting or stabbing instrument, club, or any other weapon apparently capable of producing bodily harm, in a manner, under circumstances, and at a time and place that either manifests an intent to intimidate another or that warrants alarm for the safety of other persons.

3.15.2.3 Other Safety Regulations and Authorities

For Makah Tribe members on the Makah Reservation or hunting in the Tribe's U&A, several different provisions of Title 5 of the Makah Law and Order Code, Criminal Code, prohibit acts such as assault, harassment, trespass, criminal mischief and injury to public property, which could apply to disruptions associated with protest activities. Section 3.1.2.1, Makah Tribal Departments and Agencies, describes the Makah Public Safety Department, which is responsible for enforcing the Tribal Code, and Section 3.1.2.2, Makah Tribal Programs and Management Plans, describes the Makah Tribe's law enforcement programs. Off the Makah Reservation, or for non-Indians on the reservation, the laws of Washington State apply to such activities. The Revised Code of Washington prohibits a similar suite of criminal activities that could be associated with protest activities.

3.15.3 Existing Conditions

3.15.3.1 Location of the Hunt

The bulk of the Makah U&A lies along the geographically remote and isolated Washington coast, but an arm of the U&A extends into the Strait of Juan de Fuca, in United States waters from Neah Bay to Tongue Point near Port Angeles (Figure 1-1, Project Area). The portion of the U&A along the Strait of Juan de Fuca is less remote and is bordered by public lands, communities, and State Route 112, which runs parallel to the shoreline for nearly the entire length of the Strait portion of the U&A. A few points of State Route 112 closely hug the shore. The current Coast Guard RNA is smaller than the U&A, and the portion of the RNA that extends into the Strait stops just past the Makah Reservation (Figure 3-1, Designated and Managed Areas).

3.15.3.2 Weather and Sea Conditions

3.15.3.2.1 Relevance of Weather and Sea Conditions

The IWC has recognized that prevailing weather conditions in association with relatively small vessels and traditional hunting techniques may diminish the efficiency of aboriginal subsistence whaling (see, for example, IWC Resolution 2001-2, IWC Resolution 2004-3). Seasonal and weather variations in the local environment where aboriginal hunts occur also affect the safety of whale hunts, including locating, striking, and killing the whale; recovering the whale; and towing it back to a butchering location. In its Report on Weapons, Techniques, and Observations in the Alaskan Bowhead Whale Subsistence Harvest, the United States reported that fall bowhead hunts occur under conditions that include high winds, rough seas, and ice-choked waters and stated that fatal accidents are a fact of the hunt under such treacherous conditions (Alaska Eskimo Whaling Commission 2006). The weather and sea conditions in the project area can also be treacherous, as described further below.

Dangerous weather and sea conditions for the Makah historic whale hunts are evident in their traditional equipment design, such as 36-foot-long and five-foot-wide canoes designed for seaworthiness and ability to travel great distances offshore (Arima 1983; Renker 2002) and in their statements before the British Commissioners in the 1890s, where tribal members reported that pelagic seal hunting was "practically given up" for about 20 years due to loss of lives at sea while hunting (Section 3.10.3.4, Makah Historic Whaling, Cessation of the Hunt, citing Crockford 1996). During the 1998 training exercises and the 1999 to 2000 Makah whale hunts, no weather-related accidents or fatalities occurred. All hunts occurred in late April and May, when weather and seas generally begin to improve in the Makah U&A. On May 11, 1999, the Makah suspended one of their four days of hunting for that year after less than 2 hours of hunting, due to inclement weather conditions (Gosho 1999; NMFS 1999). During the fall/winter of 1999/2000, the Makah Tribal Council did not issue any whaling permits because weather conditions were unsuitable.

Relevant weather and sea-state parameters for the project area and proposed action include air temperature, sea temperature, fog and precipitation, wind speed, and wave height. Air temperature is important to hunting safety because ocean water can freeze on deck (generally at 28.5°F [-1.9 °C]), potentially causing equipment to be slick or otherwise hampered. This could lead to injuries or reduce the accuracy and efficiency of the harpooner and rifleman. Sea temperature may also be relevant to determining the risk of hypothermia if a person involved in or protesting the hunt enters the water (for example as the result of a boat overturning or other accident). Fog and precipitation can reduce visibility, creating a potential for vessel collisions or reducing the accuracy of the harpooner or rifleman. Beattie (2001) recommended a minimum visibility standard of 500 yards in all directions during the Makah hunts, to eliminate problems with boats entering the 500-yard MEZ (Section 1.4.2, Summary of Makah Whaling — 1998 through 2007, for information about the many boats that have been associated with past Makah hunts). The Makah included this 500-yard visibility recommendation in their proposed action. Wind speed can also affect the accuracy of the harpooner or rifleman.

Wave height can affect vessel operations and stability, as well as visibility and orientation of the whale, all of which can influence the accuracy of the harpooner or rifleman. Beattie (2001) recommended that the Makah hunts institute a 30-foot distance limitation between the rifleman and the whale and require that a rifleman only fire at a downward angle, based on concerns about sea swell as it relates to accuracy (i.e., missed shots) and ricochets. The Makah's proposed action includes the 30-foot distance limit and downward firing angle. In a later report again examining the safety and guidelines for the Makah hunt, Graves et al. (2004) concluded that shots fired at or below a certain angle will not produce ricochets, "whether the water surface is glass smooth or rough with waves" (Section 3.15.3.5.2, Weapons Associated with the Hunt, Secondary Killing Methods).

3.15.3.2.2 Description of Weather and Sea Conditions in the Project Area

Sea temperature by month is displayed in Figure 3-13, Sea Temperatures at Cape Elizabeth Buoy from June 1987 through December 2001. Significant wave height (the average of the highest one-third of all wave heights recorded during 20-minute sampling periods) by month is displayed in Figure 3-14. Air temperature, precipitation, visibility, and wind information are displayed in Table 3-42, Climatological Data from Tatoosh Island. Winds in the project area are strongest from October through March (with monthly averages ranging from 14.1 to 17.4 knots), tapering off from April through August, and beginning to increase again in September (monthly averages during this period range from 8.9 to 12.2 knots) (Table 3-42). Variations in both air and sea temperature follow a seasonal pattern, with a moderate range from average monthly highs to average monthly lows. Air temperature drops steadily from September through January and February, with warming beginning in March and continuing through August. The range in average monthly temperature is 41.4° F (5.2° C) in January and 56.2° F (13.4° C) in August. Sea temperature follows a similar pattern, ranging from a low around 8° C (46° F) in January and February to 14° C (57° F) in August. Significant wave height increases during the fall and winter

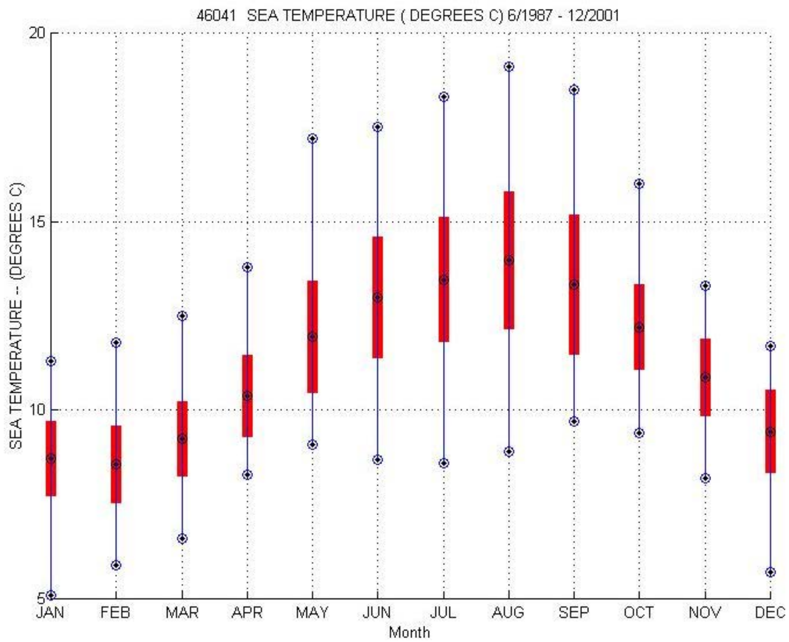
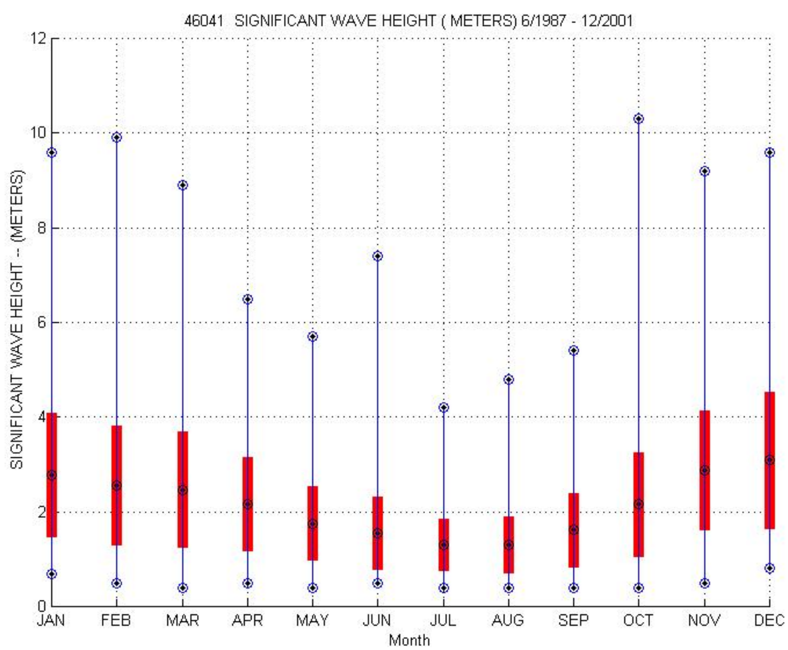


Figure 3-13. Sea Temperatures at Cape Elizabeth Buoy from June 1987 through December 2001



Source: NOAA National Data Buoy Center 2007a.

Figure 3-14. Significant Wave Height at Cape Elizabeth Buoy from June 1987 through December 2001

Source: NOAA National Data Buoy Center 2007b.

months. The range of average significant wave heights is also moderate (from around 6 feet in the summer months to around 13 feet in the winter months), but the period of time from October through March has greater variability within months, showing periods of significant wave heights exceeding 30 feet (October). There are more days of fog in July through September than the rest of the year, while precipitation (the other factor affecting visibility) is lowest from April through October.

TABLE 3-42. CLIMATOLOGICAL DATA FROM TATOOSH ISLAND, WA (48°23'N, 124°44'W, 115 FEET ELEVATION)

Weather Elements	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Yrs Of Record
Temperature (Degrees F)														
Mean	41.4	43.3	43.5	46.9	50.6	53.4	55.4	56.2	55.1	52.0	47.3	44.1	49.1	18
Mean daily maximum	44.7	46.9	47.4	51.0	54.6	57.2	59.2	60.1	59.5	55.9	50.8	47.4	52.9	18
Mean daily minimum	37.6	39.2	39.1	42.4	46.1	49.2	51.1	51.8	50.2	47.7	43.3	40.3	44.8	18
Extreme -highest	57	63	66	69	74	82	80	76	80	70	64	61	82	18
Extreme -lowest	14	20	25	33	37	43	46	45	43	36	19	14	14	18
Precipitation														
Mean amount (inches)	10.93	9.59	7.91	5.48	2.63	2.59	2.06	2.35	3.38	8.65	11.52	12.52	79.62	18
Greatest amount (inches)	20.02	21.16	14.80	10.20	6.10	6.31	6.05	4.78	7.04	13.65	22.17	16.81	101.64	18
Least amount (inches)	1.84	4.23	2.94	0.68	0.87	0.47	0.03	0.18	1.18	2.50	4.47	7.25	68.70	18
Maximum amount- in 24 hours (inches)	2.93	2.74	2.68	3.05	1.64	2.18	1.50	2.14	1.95	3.80	3.76	3.28	3.80	18
Mean number of days with precipitation	25	22	24	20	19	19	18	19	16	20	23	26	251	18
Wind														
Percent of observations with gales	6.09	3.59	1.21	1.01	0.19	0.07	0.02	0.02	0.28	2.06	3.87	5.49	2.32	19
Mean wind speed (knots)	17.4	15.9	14.1	12.2	10.3	9.1	8.9	8.9	10.4	14.1	16.6	17.4	12.9	19
Visibility														
Mean number of days with fog	11	11	9	9	10	14	18	21	17	13	10	12	155	18
Percent of observations with visibility less than or equal to ½ mile	0.96	0.74	0.46	0.67	2.73	4.97	9.50	15.12	9.81	3.96	0.95	0.43	4.19	19

*Sea level pressure is station pressure reduced to sea level.
T = trace (not measurable) of precipitation.
MISS or (blank) is a missing value.
Source: NOAA's National Climatic Data Center, National Environmental Satellite, Data & Information Service

3.15.3.3 Behavior of the Gray Whale

Early whalers referred to gray whales as 'devil fish' and 'hard head' because gray whales were reported to attack whaling skiffs when harpooned, frequently causing a loss of human life (Henderson 1984). During the IWC's 2003 workshop on whale killing methods, the Russian delegate emphasized the aggressive behavior of gray whales (IWC 2004c). The violent struggles of a struck whale can result in vessels being capsized, persons on vessels being knocked into the water (Alaska Eskimo Whaling Commission 2006), or individuals becoming entangled in the lines fastened to the whale. Even postmortem movements of a whale may be dangerous. Towing a dead whale also presents hazards, particularly if the whale is not well moored to the vessel (e.g., Alaska Eskimo Whaling Commission 2006). While the Makah hunts in 1998 through 2000 did not result in any fatal accidents, hunting disasters did occur in prior whaling days. Arima (1983) reported that, "[t]he dangerous [moments of the hunt] lasted until all the line and floats were . . . out because someone could get caught in a loop or the canoe could be capsized or smashed in the first violent struggles of the whale before it sounded."

3.15.3.4 Behavior of People Associated with the Hunt

Based on experience in the 1998 Makah training exercises and the 1999/2000 hunts, any future Makah whale hunting will likely generate some degree of public interest that may involve public protests and the media. For additional information, see Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007, and Section 3.12.3.3, Media Coverage of the 1998 through 2000 Hunts.

Before the Makah began the gray whale hunt in 1998, law enforcement authorities had advance notice of likely protests and conflicts between those protesting and those supporting the hunt. Prior to the hunt, the Makah Tribal Council directed the Makah Police Chief to form a task force of Makah departments (including the Police Department and Health Clinic) and off-reservation public safety resources (including Washington State Patrol, Clallam County Sheriff Department, Coast Guard, FBI, Department of Defense, other tribal police departments, etc.) to recommend a strategy to address any potential public disturbance related to whale hunts. The strategy called for close coordination of tribal, state, and federal authorities, including the military (Public Services, Section 3.14.3.2, Police, for more detail). The following discussion summarizes the protest activities and conflicts before and during the 1998 to 2000 whale hunts, including law enforcement response.

In 1998, the Makah whaling crew began to prepare for a hunt scheduled to start October 1, 1998. On August 25, 1998, the Makah Tribal Council passed Tribal Resolution 189-98 stating that protest vessels were not to dock at Neah Bay. This meant that protesters were not to attempt to disembark from vessels. A flotilla of protest vessels began to arrive before October 1, anchoring offshore in Neah Bay near Waadah Island. It included zodiacs, kayaks, a few larger boats belonging to the Sea Shepherd Conservation Society, and a two-person Norwegian Navy surplus submarine, painted like an orca and intended to deliver orca calls into the water to scare gray whales away. Federal and state officials advised the Sea Shepherd Conservation Society that noise emitted by the orca sub might constitute harassment under the MMPA (*Victoria Times Colonist* 1998). Others moored in nearby Sekiu, away from the reservation. The Sea Shepherd Conservation Society coordinated volunteers to conduct scouting trips up and down the coast in 15 boats, watching for the whaling canoe (Mapes 1998e). A British Columbia whale-watching charter organization representing 10 firms also appeared on October 1 (Mapes 1998e). By October 8, the protest vessels had deployed twice in reaction to a false alarm that the Makah were hunting whales (Mapes 1998e).

On November 1, 1998, one of the protesting organizations (Sea Shepherd Conservation Society) notified the Makah Tribal Council and law enforcement officials that a staged demonstration would take place. Coast Guard and Clallam County Sheriff's Office personnel remained at the Coast Guard base in Neah Bay, but stayed in contact with Neah Bay Police, who took the lead according to the previously agreed-upon task force structure (Buckingham et al. 2006). The M/V *Sirenian*, one of the larger boats, was steered up near the boat dock, and several zodiacs, kayaks, and jet skis approached and sped around inner Neah Bay. The protest boats played killer whale vocalizations over a loudspeaker and blew air horns (Mapes 1998f), shouted at tribal members onshore, and displayed protest banners. Crowds of Makah tribal members assembled on the waterfront, in cars, and on the shore, exchanging insults and honking horns; several members beat tribal drums, danced, and sang songs (Mapes 1998f; Shukovsky 1998a). Some Makah youths ran out on the docks with firecrackers and rocks, throwing them at the protest vessels, breaking a window on the *Sirenian*. Three protesters in a zodiac attempted to dock the vessel (to accept a dinner invitation from a Makah member); someone pushed one of the protesters off the dock into the water, without injury (Lacitis 1998; Mapes 1998f). Neah Bay Police subsequently detained all three protesters (Mapes 1998f). Tribal members and the police confiscated the zodiac; a fourth protester waded ashore to retrieve the zodiac and was arrested. The Neah Bay Policed turned all the detained individuals over to the Clallam Bay Sheriff's Department. The protesters all gave voluntary statements and were released without charges (Mapes 1998f). The tribal police established order on shore, and the crowd dispersed. Clallam Bay Sheriff's Department and the Federal Bureau of Investigation conducted investigations in the following days (Mapes 1998f; Shukovsky 1998b).

A group of 30 protesters attempted a simultaneous vehicle protest on State Route 112, but Neah Bay Police stopped the protesters at the reservation boundary (Mapes 1998g). On November 5, Jean-Michel Cousteau visited the Makah Reservation and asked the Makah not to hunt; the visit was cordial by all accounts (Shukovsky and Barber 1998). On November 11, 1998 protest vessels mobilized, but were responding to a false report that the Tribe was hunting and had killed and landed a whale (United States Coast Guard 1998). Talks between the leader of the Sea Shepherd Conservation Society and the Makah Tribal Council took place on November 24, 1998. Sea Shepherd reportedly assured the Makah that motivations were not racial, and the Makah reportedly assured Sea Shepherd that they did not intend to sell whale meat to Japan (Denn 1998). All the protest vessels left by November 26, 1998 (The *Edmonton Journal* 1998). A second group of anti-whaling activists offered the Tribe monetary compensation in lieu of whaling (Denn 1998b), but Tribe did not accept the offer (Denn 1998c).

The spring 1999 hunt began on May 10, 1999, and continued over four nonconsecutive days (May 10, 11, 15, and 17) in the coastal portion of the Makah U&A south of Cape Flattery (Section 1.4.2, Summary of Recent Makah Whaling, for a more complete description of hunting locations). On May 10, 1999, the hunt was disrupted by vessel-based protesters who maneuvered between the two Makah vessels and the whales. Protesters tried to scare the whales, and they also fired flares and smoke flares at the Makah whaling party vessels (NMFS 1999; Sunde et al. 1999; United States Coast Guard 1999a). Because most of the hunting occurred south of the Coast Guard's RNA, a 500-yard MEZ around the Makah vessels was not in effect (NMFS 1999). Coast Guard officials detained two of the protesters and subsequently cited them for grossly negligent operation. The Clallam County sheriff arrested them for reckless endangerment (NMFS 1999; Sunde et al. 1999; United States Coast Guard 1999a). On May 11, the Makah whaling captain called off the second hunt shortly after it began due to inclement weather.

On May 15, 1999, protest vessels operated around the whalers much of the day. Two protest vessels encountered whales. One vessel ran over the top of a whale and temporarily stunned it, while another vessel hit the flukes of a diving whale beside the Makah canoe (NMFS 1999). The Coast Guard cited four vessels for grossly negligent operations and/or MMPA infractions and took three of the vessels into federal custody (NMFS 1999). On May 17, 1999, the fourth and final day of the hunt, no protest vessels attempted to disrupt the hunt (United States Coast Guard 1999b). The Makah crew successfully landed a whale on that day. Local and regional anti-whaling activists engaged in various acts of protest after the successful 1999 hunt. Activities ranged from peaceful candlelight vigils in Seattle (Burkitt 1999b), to protests on Washington State Route 112 at the Makah Reservation boundary. The leaders of some activist groups encouraged more direct action, such as being arrested, using lock boxes (barrels filled with concrete), and lock downs (use of chains, pipes, etc. to lock individuals together) (United States Coast Guard 1999c).

Before the spring 2000 hunt began, protesters arrived, patrolling the coast in a 38-foot retired Canadian search-and-rescue vessel, equipped with two jet skis and carrying some of the activists who had been charged in 1999 with negligently operating a motorized vessel (Welch and Morris 2000). A group of 30 protesters also blocked road access to the Makah Reservation for about an hour in early April (Welch and Morris 2000). The spring 2000 hunt began on April 17, 2000, and covered seven nonconsecutive days (April 17 and 20; May 6, 7, 10, 12, and 29) in the coastal portion of the Makah U&A south of Cape Flattery (Section 1.4.2, Summary of Recent Makah Whaling, for a more complete description of hunting locations). All hunts occurred within the Coast Guard's RNA and MEZ (Gearin and Gosho 2000), unlike spring 1999 hunts, because the southward boundary of the RNA had been extended by final rule on November 10, 1999 (64 FR 61209). During the first two days of hunting (April 17 and 20), protesters disrupted the hunts (Gearin and Gosho 2000). On April 21, Coast Guard personnel boarded two protest vessels and issued warnings (United States Coast Guard 2000). One of the vessels entered the 500-yard MEZ on three occasions subsequent to the Coast Guard advisory and was intercepted and again warned by the Coast Guard (United States Coast Guard 2000). On at least one of these three entrances into the MEZ, the vessel entered the 500-yard MEZ at high speed and was intercepted within 50 yards of the Makah's canoe (Gearin and Gosho 2000). Two individuals on jet skis also entered the MEZ, making high-speed charges at the Makah canoe (United States Coast Guard 2000). The Coast Guard intercepted both jet skiers. One jet ski operator ran into a Coast Guard vessel and sustained shoulder injuries; Coast Guard personnel retrieved the individual from the water, placed the person under arrest, and transported her to Olympic Memorial Hospital (United States Coast Guard 2000). The Coast Guard also intercepted and arrested the second jet ski operator, transferring the individual to the Clallam County Sheriff's Office (United States Coast Guard 2000). On the five remaining hunting days (May 6, 7, 10, 12, and 29, 2000), one to three protester vessels were present during hunting, but they did not enter the MEZ to disrupt whale hunting.

3.15.3.5 Hunting Methods

3.15.3.5.1 <u>Vessels Associated with the Hunt</u>

The Makah traditionally hunted whales from large canoes approximately 36 feet long and more than 5 feet wide. Carvers made the canoes from a single cedar log. Currently, the Makah propose to make the initial approach and strike the whale in their traditional hunting canoe. A more modern chase vessel (a small skiff equipped with an outboard motor) would follow the traditional canoe. The second vessel would provide a platform for Tribe members (a rifleman, safety officer, and observer) who would assist in the hunt by killing a struck whale, finding a struck and lost whale, or towing a killed whale to shore. The driver of the chase boat would maneuver the rifleman to the harpooned whale to deliver a rifle shot at distances less than 30 feet from the target area.

3.15.3.5.2 <u>Weapons Associated with the Hunt</u>

Traditionally, the Makah used wooden harpoons with mussel shell tips to strike whales. The harpoon was attached to sealskin floats and lines made of sinew and cedar to secure whales. A long wooden lance was used to kill whales. After contact with American whalers, the Makah began to use iron harpoon heads and accept tows from commercial steamers. The Makah propose to hunt gray whales using a toggle-point steel harpoon, with a rope and floats attached, to strike and secure the whale and a .50 caliber rifle to kill it. This EIS also examines striking whales with a hand-thrown darting gun with either a black powder or penthrite explosive projectile, as well as killing whales with a black powder explosive projectile fired from a shoulder gun.

Primary Weapons Used to Strike (and Potentially Kill) Whales

Toggle-point Harpoon

A toggle-point harpoon is a wooden or metal shaft with a movable point (head) and is usually attached to a line (rope) and float. When the harpoon is thrust into a whale, the point twists horizontally (toggles) under the animal's skin. Pulling on the attached line secures the harpoon to the whale. The harpoon probably would not kill the whale, but it would be used initially strike and secure it with the line and floats. The Makah used a toggle point harpoon with a stainless steel point to strike and secure the whale during the 1999 hunt, and their proposal is to continue using this method of striking whales.

Darting Gun (with toggle-point harpoon plus black powder or penthrite explosive projectiles)

A darting gun is a primary weapon some subsistence hunters use to strike and potentially kill whales. It is thrown by hand and consists of a steel toggle-point harpoon (connected to a line and floats) with a barrel attached to hold an explosive projectile (also referred to as a grenade, explosive charge, super bomb, and bomb lance) (O'Hara et al. 1999). A more extensive discussion of the types of explosive projectiles used in whaling follows. The steel harpoon serves the same purpose as the toggle-point harpoon described above, attaching a line and floats to the whale. The explosive projectile has a time-delay fuse designed to detonate after penetrating the whale; it is intended to stun or potentially kill the whale in conjunction with the first strike. Whales not killed by this first strike are killed using secondary weapons (another strike with the darting gun or the shoulder gun).

Secondary Weapons Used to Kill Whales

For most aboriginal whale hunts, secondary weapons (defined as those following the primary strike) are required to kill the whale. Secondary methods used by subsistence hunters include making additional strikes with the darting gun, shooting high caliber rifles, or firing explosive projectiles from a shoulder gun. The IWC encourages hunters to use secondary weapons for animals that move or in other ways show any signs of life as a routine precaution (IWC 2007a). The IWC has identified the appropriate target area for whales killed with rifles as the brain case (brain and upper neck) and, in emergencies, the heart. For whales killed with explosive projectiles, the appropriate target areas are the thorax and neck (IWC 2007a).

High-Caliber Rifle

Several aboriginal subsistence whalers and some commercial whalers use rifles as the secondary killing method. In 1997 and 1999, the Makah Whaling Commission contracted with Dr. Allen Ingling, a University of Maryland veterinarian with a background in ballistics, to choose the optimal weapons for hunting gray whales. The Tribe's goal was to provide safe conditions for humans and to employ a humane, effective, and efficient method of killing gray whales once attached to a line and floats. Dr. Ingling and the Makah investigated the performance of several firearms, including the Garand 30'06, Winchester .458 Magnum, Weatherby .460 Magnum, State Arms and LAR .50BMG, and the .577 A-Square Tyrannosaur. Participants assessed the weapons for efficiency, safety, and humaneness by testing the depth of penetration of bullets in a water tank and evaluating weight, recoil, and loading ease (Ingling 1997; Ingling 1999). All of the weapons could kill a whale, based on test results, but participants selected the highest caliber rifles, the .50BMG and .577 A-Square Tyrannosaur, as the best options (Ingling 1999), primarily because the bullets would penetrate deeper in water, allowing a larger margin of error in targeting. The Tribe ultimately used the .577 A-Square Tyrannosaur in the 1999 hunt, because it was 6 pounds lighter that the .50BMG, it had a 3-round rather than single-shot capacity, and its shots penetrated deeper into the water.

In NMFS' 2001 EA (NMFS 2001a), reports indicated that no data on ricochet were available from the Army's .50BMG Field Manual (United States Army 1991). During a public comment period, NMFS received a report from Kline Engineering Company (Kline 2001) that assessed ricochet data, ricochet probability, and modeled trajectories for .50 caliber M33 rounds fired against sand. Kline (2001) concluded that no firings should be conducted within 6,670 yards from shore and advised that a ricochet could travel almost 1,860 yards off the line of fire. Subsequent to the Kline report, Beattie Natural Resources Consulting assessed the public safety of the 1999 hunt, specifically, the potential for injury or death from rifle fire to non-participants in the hunt. Beattie (2001) disagreed with Kline's earlier conclusions about a safety zone, but agreed there was a potential for missed shots to ricochet. Beattie (2001) made the following recommendations to enhance public safety of the hunt in the Strait of Juan de Fuca:

- Riflemen should have to use either a .50 caliber or .577 caliber rifle as the primary rifle.
- A rifleman should not shoot if the intended target is more than 30 feet from the muzzle of the rifle [to ensure that misses do not occur and to reduce the possibility of a ricochet].
- A rifleman should fire only at a downward angle [because a harpooned whale could surface at the top of a swell while the chase boat was in a position toward the middle of the trough or swell. In that situation, firing a shot might result in the unimpeded travel of the projectile toward the boundary of the MEZ, should the shot miss the whale and water].
- The Makah Whaling Commission should use simulated hunting conditions to document the riflemen's proficiency using rifles actually employed during whale hunting.
- There must be minimum visibility of 500 yards in all directions when it is harpooned (to eliminate problems with the boats entering the 500-yard MEZ due to low visibility).

- Where Highway 112 closely parallels the shoreline, the rifleman on the chase boat should fire at a whale with the rifle pointed away from the shoreline if the harpooned whale is within 500 yards of the shoreline.
- The diver on the chase boat should be the designated safety officer for the hunt (because the diver does not have another assignment or responsibility until others kill the whale). The diver should be assigned the sole task of monitoring safety conditions within the MEZ to ensure that the rifleman has a clear field of fire.

In 2004, NMFS contracted experts in military firearms training and technological capabilities to review all relevant public safety issues surrounding the conduct of Makah whale hunts, including the information presented in Kline (2001) and Beattie (2001). These experts confirmed the selection of the .50 caliber rifle as the weapon of choice, over the .577 A-Square, because it combines high power with consistently manufactured, commercial grade ammunition (Graves et al. 2004; Graves and Hazelton 2004). Graves et al. (2004) also conducted ricochet and range experiments on still water using similar weapons. They concluded that shots fired below an elevation angle of -6.2° (that is, with the gun pointed downward at the target in the water and below the shooter's horizon by at least 6.2 degrees) will ensure a very low probability of ricochets. Moreover, the probability of a ricochet declines to zero when shots are kept below the elevation angle, but wave height is greater, because wave changes in the surface geometry vastly reduce the surface area (i.e., wave tops) that can cause ricochets (Graves et al. 2004). Graves et al. (2004) also recommended that all persons near the hunt wear eye and double ear protection (i.e., earplugs and shooting muffs) when firing the rifle. This recommendation might conflict with those of Beattie (2001), which require the rifleman to communicate verbally with the safety officer.

Some aboriginal subsistence whalers use shoulder guns to deliver explosive projectiles intended to kill a whale that has already been struck with a harpoon with an attached line and floats. The explosive projectile detonates after penetrating the whale, and the explosion should kill it. A shoulder gun is generally a smooth bore seven or eight gauge weapon fired from the shoulder like a shotgun. Like a shotgun, it uses gunpowder to launch the projectile at the target. Although Øen (1995) recommended development of a shoulder gun capable of delivering a penthrite grenade, no shoulder guns adapted for this projectile currently exist.

Explosive Projectiles (Grenades)

Explosive projectiles for killing whales may contain either black powder or penthrite. Currently only darting guns have been modified to accommodate penthrite projectiles. The projectile is aimed at the neck and thoracic regions and kills the whale by damaging internal organs, either with the shock wave of the blast or tearing of tissues and hemorrhage caused by shrapnel (O'Hara et al. 1999). For each type of grenade, whether used with a hand-thrown darting gun or a shoulder gun, the grenades are very similar in shape (Øen 1995).

Black powder grenades are approximately 11.2 inches (28 cm) long and 0.9-inch (.2 cm) in diameter. The black powder in the grenade is a mixture of sulfur, saltpeter, and charcoal (Øen 1995; O'Hara et al. 1999), which explodes when ignited. Alaska Eskimos have used black powder grenades in hand-thrown darting guns in the bowhead hunt for approximately 150 years (Alaska Eskimo Whaling Commission 2006) and more recently in shoulder guns. The grenade's time-delayed fuse is designed to ignite in the barrel and detonate the grenade after it enters the whale's body. If the gun jams or the projectile detonates prematurely, it can cause a dangerous explosion on the whaling vessel (O'Hara et al. 1999). Øen reported that 18 percent of the black powder grenades malfunctioned (1995) in the 1984 to 1986 bowhead hunting seasons, though he did not describe the nature of the malfunctions. Black powder burns slowly, and less than half converts to gas (North Atlantic Marine Mammal Commission 2004). Black powder is also very sensitive to friction and electricity. Several accidents have occurred during production and the use of black powder. It is now classified as explosive, and storage and sale are entirely banned in some communities (North Atlantic Marine Mammal Commission 2004).

The penthrite grenade uses penthrite as the explosive material. A penthrite grenade consists of a tubular body that holds a charge (the penthrite), has a head with a firing mechanism, and contains safety devices. The time-delayed fuse on the penthrite grenade ignites after the grenade penetrates the whale, in contrast to the black powder grenade, which ignites in the barrel, reducing the risk of an explosion on the whaling vessel (Øen 2000). Numerous other grenade safety features are intended to prevent injury to whalers (Øen 2000). Penthrite combusts nearly instantaneously and provides substantially larger explosive power than black powder (Øen 2000). Reflecting use of advanced design and materials, a single penthrite projectile currently costs $1,000 (IWC 2007a).

The Alaska Eskimo Whaling Commission Weapons Improvement Program Committee worked with cooperating scientists from Norway on the design, testing, and manufacture of penthrite between 1987 and 1998. Participants' intent was to adapt penthrite grenades used in commercial whaling for use in the darting guns used by Alaska whalers (Alaska Eskimo Whaling Commission 2006). In 2004, the Alaska Eskimo Whaling Commission, working in conjunction with the Norwegian government, developed a safety handbook and training video regarding the function and proper use of the penthrite projectile. Whaling captains must complete training and obtain certification in the use of the penthrite projectile and modified darting gun barrel.

It is uncertain whether penthrite grenades would be readily available for a Makah Tribe gray whale hunt. The costs have risen recently due to difficulty with the manufacture and shipping of a component of the fuse head/safe and arming mechanism. A Swedish manufacturer who supplied the fuse component closed shop in 2003. Although a similar French-made component would work as a replacement, the French manufacturer has been unable to obtain necessary export authorizations (Alaska Eskimo Whaling Commission 2006; IWC 2007a). If the fuse component must come from a new supplier in Norway, the production and the new product would require detailed and costly control and testing before being available for the safe and arming mechanisms used by aboriginal subsistence whalers (Alaska Eskimo Whaling Commission 2006).

3.16 Human Health

3.16.1 Introduction

3.16.2 Regulatory Overview

The Makah Tribal Council has developed a health code in recognition of the need for delivery of comprehensive health services to tribal members and their families. Title I, Policy, states that these codes apply uniformly throughout the Makah Indian Reservation to help tribal members achieve the health status of the general population and to increase effectiveness and efficiency of services offered within the reservation. The Makah Health Code offers a framework for decision-making related to health issues. None of the provisions relates to subsistence use of whales.

3.16.3 Existing Conditions

3.16.3.1 Nutritional and Health Benefits from Consuming Whale Food Products and Other Traditional Subsistence Foods

Historically, whale oil and whale products were important nutritional components of the diet of the Makah Tribe. They also played an important role in the Makah's cultural and spiritual well being (Section 3.10.3.5, Contemporary Makah Society, for a description of Makah Tribe's subsistence consumption). Whale oil, in particular, was widely used, because it did not spoil as quickly as whale meat. Early archaeological studies indicated that as much as 84 percent of the Makah diet was whale meat, oil, and other food products (Renker 2002). The Makah currently and historically have used the following whale products (Renker 2002): raw blubber, oil rendered from whale blubber, organ meats (e.g., brain, heart) and muscle tissue from all parts of the whale (including around the jaw and under the eye). They use the rich oil for cooking, flavoring foods, and as a condiment (Renker 2002).

The introduction of the western diet (i.e., refined sugar and flour, beef, vegetable oil and lard, etc.) and the reduction in subsistence foods have been linked to poor health in Native American populations (Budowski 1988; Simopoulos 1999; Renker 2002) and also in Alaska Eskimos (IWC 1979b; Ebbesson et al. 2005a). The Makah Tribe, however, continues to consume large quantities of marine fish and shellfish. On average, Makah households consume 126 pounds per year (156 grams per day) of finfish and shellfish (Renker 2002).

Historically, the Makah consumed large quantities of whale products and fish (Renker 2002) and this reliance on marine foods resulted in a diet with a narrow nutritional base. General nutritional components of whale meat[10] and other protein sources are compared in Table 3-43.

Nutritional data are from the United States Department of Agriculture Nutrient Database (United States Department of Agriculture 2005). With the exception of whale oil and blubber, whale products have a similar nutritional profile (e.g., calories, protein, fat, and calcium) as other finfish, shellfish, wild game, and domestic meats. Whale oils and blubber provide a richer source of energy (calories) than other food types listed in Table 3-43, and whale meat has higher levels of iron. Whale oil is a good source of vitamin E (an antioxidant), and whale meat is a good source of selenium; both of which may play a role in protecting against the toxicity of certain seafood contaminants like mercury (Arnold and Middaugh 2004). Overall, however, it is difficult to compare essential nutrients and minerals of whale products directly to other protein sources because the former have not been studied extensively.

In addition to providing protein and energy, marine foods also contain essential vitamins, minerals, and lipids. Essential lipids include polyunsaturated fatty acids, which are important components of both whale and fish oils and are high in omega-3 polyunsaturated fatty acids (e.g., alpha-linolenic acid, eicosapentaenoic acid, docosapentaenoic acid, and docosahexenoic acid). These essential fatty acids improve or prevent symptoms associated with coronary heart disease, hypertension, Type 2 diabetes, kidney disease, rheumatoid arthritis, Crohn’s disease, and

10 Whale food products nutritional information shown in Table 3-43 includes data for bowhead and minke whales (both baleen whales like the gray whale) and beluga (a toothed whale distinct from baleen whales).

chronic obstructive pulmonary disease (Budowski 1988; Simopoulos 1999; Simopoulos 2002; Holub and Holub 2004; Ebbesson et al. 2005b; Ebbesson et al. 2005b c; Reynolds et al 2006).

The human body does not naturally produce essential polyunsaturated fatty acids, so they must come from food consumed. Polyunsaturated fatty acids exist in a variety of food sources including fish oils, vegetable oils (e.g., soybean), nuts, and meat from terrestrial or marine mammals (e.g., whales), and vitamin supplements (National Academy of Sciences 2005).

Studies of subsistence populations that consume higher quantities of seafood than the general United States population, and consequently ingest higher levels of omega-3 fatty acids, suggest that these populations have lower rates of heart disease than the general population (Dewailly et al. 2001; McLaughlin et al. 2005). For example, McLaughlin et al. (2005) found that Alaska Natives with high dietary intake of polyunsaturated fatty acids (evidenced by higher tissue levels of polyunsaturated fatty acids) had lower heart disease mortality than non-natives.

Ebbesson et al. (2005b) measured fatty acid concentrations in Norton Sound (Alaska) Eskimos and screened for insulin resistance and diabetes. Findings indicated that high consumption of omega-3-fatty acids positively affected insulin sensitivity and glucose tolerance. Osterud et al. (1995) studied healthy men and women given supplements of oils (15 milliliters [mL]/day) from the blubber of seal, cod liver, and Minke whale for 10 weeks. Supplementation of the diet, especially with whale oil, had beneficial effects on biological measures associated with cardiovascular and thrombotic diseases.

Reynolds et al. (2006) reported on the high levels of omega-3 fatty acids in bowhead whale blubber consumed by Alaska Natives. The high levels of omega-3-fatty acids in the blubber and other marine mammal food products confer considerable health benefits on subsistence consumers and are important in the treatment or prevention of insulin resistance, diabetes, elevated blood pressure, cardiovascular disease, arthritis, and stroke (Reynolds et al. 2006).

Seafood diets containing essential polyunsaturated fatty acids are also beneficial for women at risk for hypertension during pregnancy (Popeski et al. 1991) and may prolong gestation and increase birth weight (Olsen et al. 1993; Grandjean et al. 2001). There was, however, a limit to the observed positive effects on birth weight, as researchers did not find increased weights at higher intake levels (greater than three fish meals per week) of essential fatty acids (Olsen et al. 1993; Grandjean et al. 2001). The National Academy of Sciences (2005) recommends dietary intake of polyunsaturated fatty acids (i.e., alpha-linolenic acids) at 0.5 grams/day (infants), 0.7 to 0.9 grams/day (children), and 1.0 to 1.6 grams/day (adults).

TABLE 3-43. USDA NUTRITIONAL VALUES FOR SELECTED FOOD TYPES

FOOD TYPE	ENERGY (CALORIES /100G)	PROTEIN (G/100G)	CALCIUM (MG/100G)	IRON (MG/100G)	SELENIUM (µG/100G)	VITAMIN A (IU/100G)	VITAMIN E (MG/100G)	VITAMIN B6 (MG/100G)	VITAMIN B12 (µG/100G)	TOTAL FAT (G/100G)	TOTAL SATURATED FAT (G/100G)	TOTAL MONO-UNSATURATED FAT (G/100G)	TOTAL POLY-UNSATU-ATED FAT (G/100G)
Whale													
Beluga meat, raw	111	26.5	7	25.9	36.5	340	n/a	0.05	2.59	0.5	0.092	0.337	0.025
Beluga oil	900	n/a	n/a	n/a	3.0	2310	8.27	n/a	n/a	100	14.49	54.19	10.8
Beluga eyes	291	19.6	n/a	n/a	n/a	1870	n/a	n/a	n/a	23.3	n/a	n/a	n/a
Beluga flipper, raw	271	19.0	11	2.8	n/a	930	n/a	n/a	n/a	21.7	n/a	n/a	n/a
Beluga liver, raw	117	18.4	11	n/a	n/a	22100	n/a	n/a	n/a	3.9	n/a	n/a	n/a
Bowhead skin and subcutaneous fat [1]	470	12.6	5	n/a	n/a	750	n/a	n/a	n/a	46.1	6.56	28.12	7.97
Bowhead, meat [2]	n/a	26.2 [2]	n/a	14.1 [2]	n/a	330 [2]	n/a	n/a	n/a	2.6 [2]	n/a	n/a	n/a
Bowhead oil	900	n/a	n/a	n/a	n/a	2810	n/a	n/a	n/a	100	n/a	n/a	n/a
Bowhead, blubber	870	0.4	n/a	0.5	n/a	n/a	n/a	n/a	n/a	96.5	n/a	n/a	n/a
Minke skin and subcutaneous fat, raw [1]	n/a	n/a	n/a	n/a	6.28[4]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Minke lean meat [3]	116	24.8	4.1	8.54	0.21[4]	n/a	n/a	n/a	n/a	1.2	18.5	49.2	21
Fish and Shellfish													

Food Type	Energy (calories /100g)	Protein (g/100g)	Calcium (mg/100g)	Iron (mg/100g)	Selenium (µg/100g)	Vitamin A (IU/100g)	Vitamin E (mg/100g)	Vitamin B6 (mg/100g)	Vitamin B12 (µg/100g)	Total Fat (g/100g)	Total Saturated Fat (g/100g)	Total Mono-unsaturated Fat (g/100g)	Total poly-unsatu-ated Fat (g/100g)
Salmon, Chinook, raw	179	19.9	26	0.3	36.5	453	1.22	0.4	1.3	10.4	3.1	4.4	2.8
Salmon, coho, wild, raw	146	21.6	36	0.6	36.5	100	0.65	0.55	4.17	5.9	1.26	2.13	1.99
Salmon, sockeye, raw	168	21.3	6	0.5	33.7	192	n/a	0.19	5.0	8.6	1.5	4.13	1.88
Halibut, raw	110	20.8	47	0.8	36.5	157	0.85	0.34	1.18	2.3	0.33	0.75	0.73
Crab, Dungeness, raw	86	17.4	46	0.4	37.1	90	n/a	0.15	9.0	1.0	0.12	0.17	0.32
Wild Game													
Elk, meat, raw	111	23.0	4	2.8	9.8	n/a	n/a	n/a	n/a	1.5	0.53	0.36	0.30
Deer, meat, raw	120	23.0	5	3.4	9.7	n/a	0.2	0.37	6.31	2.4	0.95	0.67	0.47
Domestic Meat													
Beef, composite of trimmed retail cuts, trimmed to 1/2-inch fat, prime, raw	169	21.0	6	2.3	18.7	n/a	n/a	0.43	3.25	8.8	3.41	3.82	0.37
Chicken, breast, meat and skin, raw	172	20.9	11	0.7	16.6	83	0.31	0.53	0.34	9.3	2.66	3.82	1.96

n/a = Data are not available. [1] This type of tissue is referred to by several different names (population specific), including maktak, muktuk or mattak.

(g) = grams (mg) = milligrams (ug) = micrograms (IU) = international units Sources: USDA National Nutrient Database (http://www.nal.usda.gov/fnic/foodcomp/search/); [2] IWC 1979b; [3] Suzuki 1993; [4] Hansen et al 1990

In summary, the many benefits associated with consuming marine seafood products, including whale, are well documented in the scientific literature. Marine mammal food products are rich with many of the same nutrients found in commonly consumed seafood products (fish and shellfish), and, in the case of some minerals and vitamins, marine mammal products provide an even richer source.

3.16.3.2 Environmental Contaminants in Gray Whales

While there is documented evidence of the beneficial effects of the nutrients in marine foods, persistent and potentially toxic chemicals also occur and are documented in the diets of native subsistence populations (Verbrugge and Middaugh 2004; Arnold and Middaugh 2004). In considering the type and amount of chemicals the Makah could ingest by consuming whale products, their continuing exposure to these contaminants is also a result of their ongoing, high consumption of other seafood products, including finfish and shellfish. Numerous researchers have documented concentrations of organic and inorganic contaminants in the tissues (muscle, organs, etc.) of the gray whales proposed for hunting by the Makah (Varanasi et al. 1994; Jarman et al. 1996; Krahn et al. 2001; Mendez et al. 2002; Ruelas-Inzunza and Paez-Osuna 2002; Tilbury et al. 2002; Ruelas-Inzunza et al. 2003; Dehn et al 2006a. Dehn et al 2006b).

Whale habitat and migration patterns should be considered when evaluating contaminant concentrations because these factors may affect the magnitude of contaminant concentrations (Houde et al 2005). The concentration of contaminants in whale tissues will also vary based on the feeding habits of the whale (Houde et al 2005) and whether the whale is freshly killed or stranded. Gray whales targeted by the Makah filter their food using the bony baleen plates located in their mouths (Vaughn 1978). Typically, this food consists of plankton and other micro- and macrofauna (Vaughn 1978). The levels of contaminants it contains are often lower because of the lesser position of these fauna in the overall marine food chain. Therefore, data on contaminant concentrations in whales that use other feeding strategies, such as toothed whales feeding on larger, older fish that accumulate greater levels of chemicals, are not presented here because they have less relevance to the types of whale (or associated contaminant levels) that are hunted by the Makah (i.e., gray whales). Distinctions are made between contaminant levels in freshly harvested versus stranded whales, because they are often lower in freshly harvested whales than in stranded whales (Rugh et al 1999; Krahn et al 2001).

As previously discussed, the Makah Tribe historically consumed large quantities of whale meat and blubber and, to a lesser extent, other portions of the whale (Renker 2002). In the past decade, the

Makah have consumed much smaller quantities of whale products (i.e., on a total biomass basis) compared with historical times. The animals consumed include both stranded as well as one freshly harvested animal following the 1999 hunt. The remainder of this section focuses on describing chemical concentrations measured in whale meat (muscle) and blubber because these are the parts of the whale that are most often consumed. A summary of contaminant concentrations in gray whale blubber and muscle tissue is presented in Table 3-44. Organic compounds (e.g., PCBs, pesticides, and dioxins) are associated predominantly with whale blubber because these compounds are lipophilic (i.e., easily dissolve in lipids or fat). Mean blubber concentrations of chlordane, DDTs, dieldrin, hexachlorobenzene, mirex, and PCBs in gray whales collected during subsistence hunts (Russian) in the Bering Sea in 1994 (Krahn et al. 2001 and Table 3-44) were 150, 150, 77, 230, 1.6, and 630 micrograms per kilogram (μg/kg) wet weight, respectively. These concentrations tended to be two to three times lower than those measured in stranded gray whales collected over the 1990s in Washington (Table 3-44), indicating that contaminant concentrations may be higher in diseased or aged whales, or in animals in poor nutritional health, that may strand in the Puget Sound region (Table 3-44). Concentrations of PCBs (1,200 μg/kg wet weight) and DDTs (520 μg/kg wet weight) in blubber of the whale caught by the Makah Tribe in 1999 were, however, higher than the mean levels reported in stranded gray whales or in those hunted in the Bering Sea.

Concentrations of organic contaminants in whale blubber typically were higher or comparable to those in other tissues (e.g., muscle, liver, kidney, or brain) (Krahn et al. 2001). Tissue biopsy concentrations (DDT, hexachlorobenzene, and PCBs), collected from Washington State waters using a dart collection method on live whales, tended to be lower than those measured from subsistence or stranded samples (Table 3-44). Jarman et al. (1996) found mostly non-detected concentrations (less than 0.002 μg/kg wet weight) of dioxins in two gray whales measured off California. The concentrations of organic compounds in gray whales typically were lower than in other whale species (Varanasi et al. 1994; Jarman et al. 1996; Krahn et al. 2001; Tilbury et al. 2002).

Few measurements of metal concentrations are available for blubber or muscle of gray whales, and those available are from stranded whales (Mendez et al. 2002; Ruelas-Inzunza and Paez-Osuna 2002; Rueles-Inzunza et al. 2003). Metal concentrations typically are higher in muscle tissue compared to whale blubber (Table 3-45). Mean concentrations of metals in muscle tissue from various studies range from 0.4 to 0.86 cadmium, 3.1 to 4.1 copper, 305 to 1,009 iron, 0.6 to 1.11 lead, 0.33 to 0.8 manganese, 0.145 mercury, 1.39 nickel, and 120 to 279 zinc μg/kg dry weight. Methyl mercury comprised approximately 75 percent of the total mercury measured in gray whale muscle (Ruelas-Inzunza et al. 2003). Metal concentrations typically were higher in liver and kidney tissues than in muscle or blubber tissues (Mendez et al. 2002; Ruelas-Inzunza and Paez-Osuna 2002; Ruelas-Inzunza et al. 2003). Metal concentrations were not reported for the whale the Makah Tribe caught in 1999.

Since 1998, Chukotka Natives have been reporting a number of hunted whales from the Bering Sea that exhibit a strong medicinal odor, referred to as the 'stinky whale' phenomenon (IWC 2007b). Tissues from these whales have been deemed inedible by hunters. No known cause has been found, but research is ongoing to determine whether the smells are caused by chemical contaminants, disease, or other factors. At the IWC annual meeting in 2006, the United States and the Russian Federation reported on progress with their 2005 investigations. Samples were obtained from two stinky whales killed in the 2005 Chukotka Native hunts; data included chemical and toxicological analyses. These data will be available, and they will be reported on at the IWC annual meeting in 2007. At the 2006 meeting, Mexico also reported on a related gray whale study started on winter range breeding and calving grounds in March 2006, in response to inquiries about potential chemical pollution in Mexican waters. Mexico obtained breath samples for chemical analyses from free swimming whales and will present analyses of those data at the IWC annual meeting in 2007. Similar data were to be collected 2007 from free swimming whales off the Washington coast and reported on at IWC (IWC 2007b).

TABLE 3-44. CONCENTRATIONS OF ORGANIC COMPOUNDS MEASURED IN FRESHLY HARVESTED AND STRANDED GRAY WHALE TISSUES

ORGANIC COMPOUND	CONCENTRATION IN BLUBBER (µG/KG-WW)[1]	CONCENTRATION IN MUSCLE (µG/KG-WW)[1]	COMMENT	EFERENCE
Chlordane	150 ± 21	1± 0.2	Tissue from subsistence hunts (Russian Bering Sea 1994)	Krahn et al. 2001; Tilbury et al. 2002; Varanasi et al. 1994
	340 ± 120	NA	Tissue collected from stranded whales (1988 to 1991)	
DDTs	130 ± 26	NA	Tissue biopsies from live whales in WA State (1996 to 1998)	Krahn et al. 2001; Tilbury et al. 2002; Varanasi et al. 1994; Ylitalo et al. 1999
	150 ± 32	1± 0.2	Tissue from subsistence hunts (Russian Bering Sea 1994)	
	450 ± 140	NA	Tissue collected from stranded whales (1988 to 1991)	
	240 ± 44	NA	Tissue collected from stranded whales (1999)	
	520	3.2	Tissue from the Makah whale hunt (1999)	
Dieldrin	77 ± 14	NA	Tissue from subsistence hunts (Russian Bering Sea 1994)	Krahn et al. 2001; Varanasi et al. 1994
	160 ± 72	NA	Tissue collected from stranded whales (1988 to 1991)	
Hexachlorobenzene	100 ± 41	NA	Tissue biopsies from live whales in WA State (1996 to 1998)	Krahn et al. 2001; Tilbury et al. 2002; Varanasi et al. 1994
	230 ± 32	2 ± 1	Tissue from subsistence hunts (Russian Bering Sea 1994)	
	350 ± 130	NA	Tissue collected from stranded whales (1988 to 1991)	
	510 ± 130	NA	Tissue collected from stranded whales (1999)	
Mirex	1.6 ± 0.2	NA	Tissue from subsistence hunts (Russian Bering Sea 1994)	Krahn et al. 2001; Varanasi et al. 1994
	14 ± 4.6	NA	Tissue collected from stranded whales (1988 to 1991)	
PCBs	220 ± 42	NA	Tissue biopsies from live whales in WA State (1996 to 1998)	Krahn et al. 2001; Tilbury et al. 2002; Varanasi et al. 1994; Ylitalo et al. 1999
	630 ± 82	9 ± 2	Tissue from subsistence hunts (Russian Bering Sea 1994)	
	970 ± 240	NA	Tissue collected from stranded whales (1988 to 1991)	
	600 ± 130	NA	Tissue collected from stranded whales (1999)	
	1200	12	Tissue from the Makah whale hunt (1999)	
PCDDs/PCDFs	<0.002	NA	Concentrations measured in tissue (1987 to 1988)	Jarman et al. 1996
2,3,7,8-TCDD	<0.002 – 0.003	NA	Concentrations measured in tissue (1987 to 1988)	
2,3,7,8-TCDF				

1 Values represent the mean ± the standard error of the mean µg/kg – micrograms per kilogram

ww wet weight

NA Not Available

DDT Dichloro-Diphenyl-Trichloroethane

PCB Polychlorinated Biphenyl

PCDD Polychlorinated Dibenzodioxin

PCDF Polychlorinated Dibenzofuran

TCDD Tetrachlorodibenzodioxin

TCDF Tetrachlorodibenzofuran

Source: see reference column.

TABLE 3-45. CONCENTRATIONS OF METAL/METALLOID(S) MEASURED IN FRESHLY HARVESTED AND STRANDED GRAY WHALE TISSUES

METAL/METALLOID	CONCENTRATION IN BLUBBER (MG/KG-DW)[1]	CONCENTRATION IN MUSCLE (MG/KG-DW)[1]	OMMENT	EFERENCE
Cadmium	0.16	0.86 + 1.05	Tissue collected from stranded whales (1999)	Mendez et al. 2002
	NA	0.4 + 0.2	Tissue collected from stranded whales (1999)	Ruelas-Inzunza and Paez-Osuna 2002
	NA	0.02 + 0.002	Tissue collected from harvested whales (2001)	Dehn et al. 2006
Copper	1.72 ± 0.90	3.10 + 1.65	Tissue collected from stranded whales (1999)	Mendez et al. 2002
	NA	4.1 + 1.7	Tissue collected from stranded whales (1999)	Ruelas-Inzunza and Paez-Osuna 2002
	NA	3.17 + 0.62 C	Tissue collected from harvested whales (2001)	Dehn et al. 2006
Iron	28.9 ± 14.7	305 + 217	Tissue collected from stranded whales (1999)	Mendez et al. 2002
	NA	1009 + 802	Tissue collected from stranded whales (1999)	Ruelas-Inzunza and Paez-Osuna 2002
Lead	1.06 ± 0.73	1.11 + 0.69	Tissue collected from stranded whales (1999)	Mendez et al. 2002
	NA	0.6 + 0.4	Tissue collected from stranded whales (1999)	Ruelas-Inzunza and Paez-Osuna 2002
Manganese	0.44 ± 0.13	0.33 + 0.22	Tissue collected from stranded whales (1999)	Mendez et al. 2002
	NA	0.8 + 0.1	Tissue collected from stranded whales (1999)	Ruelas-Inzunza and Paez-Osuna 2002
Mercury	NA	0.145 + 0.082	Tissue collected from stranded whales (1999)	Ruelas-Inzunza et al. 2003
	NA	0.02 + 0.002	Tissue collected from harvested whales (2001)	Dehn et al. 2006
Methyl mercury	NA	0.109 + 0.040	Tissue collected from stranded whales (1999)	Ruelas-Inzunza et al. 2003
Nickel	1.10 ± 0.60	1.39 + 0.79	Tissue collected from stranded whales (1999)	Mendez et al. 2002
Selenium	NA	0.19 + 0.01	Tissue collected from harvested whales (2001)	Dehn et al. 2006
Silver	NA	0.004 + 0.0001	Tissue collected from harvested whales (2001)	Dehn et al. 2006
Zinc	16.0 ± 4.89	120 + 34.4	Tissue collected from stranded whales (1999)	Mendez et al. 2002
	NA	279 + 104	Tissue collected from stranded whales (1999)	Ruelas-Inzunza and Paez-Osuna 2002
	NA	39.47 + 4.53	Tissue collected from harvested whales (2001)	Dehn et al. 2006

1 Values represent the mean ± the standard error of the mean dw = dry weight µg/kg = micrograms per kilogram mg/kg = milligrams per kilogram
NA Not Available Source: see reference column

3.16.3.3 Exposure to Food-Borne Pathogens

Millions of cases of food-borne illness occur each year in the United States, and causes include consumption of subsistence products (Himelbloom 1998). Humans can be exposed to several types of pathogenic bacteria (e.g., *Clostridium botulinum*) during the harvesting, processing, preparation, and consumption of marine foods (e.g., fish, shellfish, or whale meat). There are reports of food-borne illness in Alaska Native subsistence communities where residents frequently consume whale meat and blubber, e.g., cases of botulism and salmonellosis in Alaska Natives consuming hunted or drift whales (Bender et al. 1972; Shaffer et al. 1990; McLaughlin et al. 2004; Sobel et al. 2004). From 1990 to 2000, 58 botulism events occurred in Alaska with 103 persons affected (Sobel et al. 2004). In 49 of these events, the contaminated food was identified as homemade Alaska Native foods consisting of fermented aquatic animal tissues, including whale skin or blubber (Sobel et al. 2004). The most common forms of food-borne pathogens identified when subsistence populations consume improperly cooked or handled food products (not just gray whale products) are characterized in Table 3-46. Like other subsistence cultures, the harvesting and consumption of ill-prepared or improperly stored gray whale products represent a potential pathway for exposure of the Makah Tribe to food-borne pathogens.

The Makah Tribe hunted and harvested a gray whale in 1999. The following is an account Renker (2002) describes the processing of the whale caught in 1999. The account illustrates some potential health-related issues.

Some 1,400 Makahs welcomed the whale to Front Beach in Neah Bay, and paid honor to the great creature. Many Makahs ate raw blubber right on the spot, and then began the task of preparing the food and resources that the whale contributed to the Makah people. Butchering the whale proved a huge task for the Makah people. Lack of familiarity with the gray whale anatomy, tools which were not well adapted for gray whale meat and blubber, and logistical issues presented immediate obstacles for the butchering process which began on Front Beach. Some confusion also centered on whale parts other than meat and blubber. Most importantly, Makah were able to overcome these problems and continue with the job of processing the whale.

TABLE 3-46. CHARACTERISTICS OF FOOD-BORNE PATHOGENS[1]

PATHOGEN	SOURCE	PREFERRED ENVIRONMENT	SYMPTOMS
Clostridium botulinum	Soil and aquatic environments	Temperature range: 3.3 to 50 °C (38 to 122 °F) pH range 4.6 to 9.0 Salt tolerance: 5 to 10 percent Oxygen: Strict anaerobe[2]	Symptoms are double vision, paralysis, dizziness, difficulty swallowing, speaking and breathing. Symptoms occur 12 to 72 hours after ingestion.
Enteropathogenic bacteria (Salmonella, Shigella, Escherichia coli, Yersinia and Campylobacter)	Human and animal intestines, feces	Temperature range: 5 to 47 °C (41 to 117 °F) pH range: 4.5 to 9.0 Salt tolerance: 1 to 3 percent Oxygen: Facultative anaerobe[3]	Symptoms are diarrhea, abdominal pain, fever, nausea, dehydration, urinary tract infection, kidney failure. Symptoms occur 6 to 48 hours after ingestion.
Listeria monocytogenes	Humans, animals, vegetation	Temperature range: 2.5 to 44 °C (36 to 111 °F) pH range: 5.0 to 9.5 Salt tolerance: 10 to 30 percent Oxygen: Facultative anaerobe	Symptoms are flu-like, diarrhea, mild fever, stillbirth or spontaneous abortion. Symptoms occur 1 day to weeks after ingestion.
Staphylococcus aureus	Humans and animals	Temperature range: 10 to 45 °C (50 to 113 °F) pH range: 4.5 to 9.3 Salt tolerance: 10 to 20 percent Oxygen: Facultative anaerobe	Symptoms are vomiting, diarrhea, no fever. Symptoms occur 1 to 8 hours after ingestion.

1 The food-borne pathogens in Table 3-46 are provided for general information and do not imply that gray whale products contain all of these pathogenic organisms.

2 Strict anaerobes are bacteria that grow under anaerobic conditions (without oxygen), use anaerobic respiration, and are poisoned by oxygen.

3 Facultative anaerobes are bacteria capable of growing under either aerobic (with oxygen) or anaerobic conditions.

Source: Himelbloom (1998).

In a matter of hours, a flatbed truck had taken what was left of the whale and driven to the Makah Tribe's fish plant, a processing plant with 800 cubic feet of freezer space and a service entrance large enough to allow the flatbed to drive inside. Within 24 hours, Front Beach showed no sign of the momentous event which had happened the previous day. The Makah butchering crew, which included Makahs who had traveled to Alaska to learn the processing techniques, had some assistance from a Native Alaskan. Many people worked to butcher the parts of the whale that had not been distributed to Tribal members on the night of 17 May. In addition to meat and blubber, Makahs interviewed during the Makah Household Survey reported requesting and receiving whale lice, sinew, baleen, brain, and heart. Other Makahs reported that they would have liked to receive liver, cheeks, eyes, and intestines. Some of these items, like whale lice and baleen, are primarily used for ceremonial reasons, while others can be used in tool production or as food. The bulk of the food products derived from the whale were reserved for the Tribe's celebratory feast, which was to be held on 22 May.

In private homes, people welcomed whale meat, blubber, and other whale parts. Between 17 May and 22 May, some households began to use recipes held in family confidence for decades, and others experimented with techniques used for other sea creatures, like seals and fish.

In summary, pathogenic organisms can and do occur in marine mammal food products, including seals, walrus, dolphins, and whales. Illness has been reported in those who eat these products, though they typically come from consuming either stranded or drift animals, or they result from improper preparation of traditional food products.

3.17 National and International Regulatory Environment

3.17.1 Introduction

The following sections describe national conditions related to the harvest of marine mammals, international conditions related to the harvest of whales, and international conditions related to the pursuit of ceremonial and subsistence practices by indigenous people.

In the United States, take of marine mammals is prohibited (except under certain circumstances, unless the Secretary of Commerce waives the MMPA take prohibition, adopts regulations and issues permits (Section 1.2.3, Marine Mammal Protection Act). Harvest of whales is prohibited by WCA regulations, except for aboriginal subsistence whaling authorized by paragraph 13 of the IWC Schedule (50 CFR 230.2) (Section 1.2.4.2, National Whaling Governance under the WCA). This section reviews past waivers and requests for waiver of the MMPA take prohibition.

Internationally, harvest of whales is regulated by the ICRW (Section 1.2.4.1., International Whaling Governance under the ICRW), which established the IWC as the regulatory body governing whaling (Section 1.2.4.1.1, Functions and Operating Procedures of the IWC). While the IWC initially focused on regulating commercial harvest, from 1982 to 1986 the body phased in a moratorium on commercial whaling to be in effect pending adoption of a revised management scheme. Since that time the parties to the ICRW have attempted to adopt a regulatory regime that would govern commercial harvest; these attempts have been unsuccessful, so the moratorium remains in effect. The ICRW also governs aboriginal subsistence whaling but does not set limits on lethal research on whales. This section examines the whaling that has occurred worldwide since the IWC moratorium, the debates within the IWC over the different types of whaling, the United States' role in those debates, and the potential relationships between the positions and actions of the United States and whaling worldwide.

The ability of indigenous people to pursue ceremonial and subsistence practices has also emerged in recent decades as an international issue. This section examines the pursuit of ceremonial and subsistence practices by indigenous people internationally.

3.17.2 Regulatory Overview

3.17.2.1 Marine Mammal Protection Act

The MMPA take moratorium and the process for waiving the moratorium are described in detail in Section 1.2.3., Marine Mammal Protection Act. In addition to those provisions, Section 109 of the Act preempts state authority governing marine mammals, but includes provisions for the Secretary to waive the take moratorium and return management authority to a state if certain conditions are met.

3.17.2.2 Whaling Convention Act

The WCA is described in detail in Section 1.2.4., Whaling Convention Act.

3.17.2.3 International Convention for the Regulation of Whaling

The ICRW is described in detail in Section 1.2.4.1., International Whaling Governance under the ICRW, in particular its provisions regarding commercial and aboriginal subsistence whaling. In addition, Article VIII of the ICRW authorizes parties to permit scientific whaling, subject to conditions the contracting government thinks fit. Any killing or taking of whales under Article VIII is exempt from the operation of the convention. Article VIII also specifies requirements for reporting on and utilizing (processing and distributing) whales after they are killed for scientific research. While contracting governments must submit scientific research permits to the IWC and its Scientific Committee for review, it is the contracting government that ultimately decides whether to issue a permit.

3.17.2.4 Pelly Amendment

Under the Pelly Amendment (22 USC 1978) to the Fishermen's Protective Act of 1954, when the Secretary of Commerce determines that the nationals of a foreign country are diminishing the effectiveness of an international fishery conservation program (including the IWC's program), the Secretary certifies this fact to the President. The President then has the discretion to ban imports of any products from the offending country “to the extent such prohibition is sanctioned by the World Trade Organization” (22 USC 1978). After making a certification, the Pelly Amendment requires the Secretary of Commerce to periodically review the activities of nationals of the offending country to determine if the reasons for which the certification was made no longer prevail. If so, the Secretary shall terminate the certification. If not, the certification remains active. (22 U.S.C 1978 (d). A “Pelly Certification” has the potential to dissuade foreign governments from particular activities through a public announcement of their certification and the possibility of trade or non-trade sanctions. As of October 28, 2003, the Secretary had made 36 certifications under the Pelly Amendment, with trade sanctions invoked four times (House Report 108-327, October 28, 2003). Fifteen of the certifications were for whaling activities; no trade sanctions have been imposed based on certifications for whaling activities. Currently Norway, Iceland and Japan remain under active certifications under the Pelly Amendment

3.17.2.5 Packwood-Magnuson Amendment

In 1979 Congress passed the Packwood-Magnuson Amendment to the Magnuson Act of 1976. It requires the Secretary of Commerce to “periodically monitor the activities of foreign nationals that may affect [international fishery conservation programs],” (22 USC 1978(a)(3)(A)) “promptly investigate any activity by foreign nationals that, in the opinion of the Secretary, may be cause for certification,” (22 USC1978(a)(3)(B)); and “promptly conclude; and reach a decision with respect to; [that] investigation” (22 USC 1978(a)(3)(C)). If the Secretary of Commerce certifies that “nationals of a foreign country, directly or indirectly, are conducting fishing operations or engaging in trade or taking which diminishes the effectiveness of the International Convention for the Regulation of Whaling,” (16 U.S.C. 1821(e)(2)(A)(i)), the Secretary of State must reduce, by at least 50 percent, the offending nation's fishery allocation within the United States' fishery conservation zone (16 USC 1821(e)(2)(B)). Although the Amendment requires the imposition of sanctions when the Secretary of Commerce certifies a nation, it did not alter the initial certification process, except for requiring expedition. It also provided that a certification under the Packwood-Magnuson Amendment also serves as a certification for the purposes of the Pelly Amendment (16 USC 1821(e)(2)(A)(i).

The Packwood-Magnuson Amendment is no longer influential, since no foreign whaling nation currently fishes in United States waters (Buck 1998).

3.17.2.6 International Law Regarding Indigenous People

The United States is not a party to a treaty on indigenous practices. International Labour Organization Convention 169 contains provisions relevant to the rights of indigenous people to use subsistence resources. Article 2 of the Convention provides that governments that are parties are responsible for protecting rights of indigenous people, including actions to promote their cultural rights and “respect for their social and cultural identity, their customs and traditions and their institutions.” Article 8 provides that indigenous people shall have the right to retain their own customs . . . where these are not incompatible with fundamental rights defined by the national legal system." Article 8 further provides that "[p]rocedures shall be established . . . to resolve conflicts which may arise in the application of this principle." This Convention, however, does not govern United States practice. The Convention has only 12 parties, and the United States is not one of them.

The United Nations Draft Declaration on the Rights of Indigenous People also has several relevant provisions. Article 3 provides that "[i]ndigenous people have the right of self-determination" and that "[b]y virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development." Article 21 provides that indigenous people "have the right to maintain and develop their political, economic and social systems, to be secure in the enjoyment of their own means of subsistence and development, and to engage freely in all their traditional and other economic activities." Article 26 provides that indigenous people

> have the right to own, develop, control and use the lands and territories, including to total environment of the lands, air, waters, coastal seas, sea-ice, flora and fauna and other resources which they have traditionally owned or otherwise occupied or used. This includes the right to the full recognition of their laws, traditions and customs, land-tenure systems and institutions for the development and management of resources.

The United States, through the representative of New Zealand, expressed serious reservations to the draft declaration:

> The representative of New Zealand, speaking also on behalf of Australia and the United States, said those countries could not accept the adoption of a text that was confusing, unworkable, contradictory and deeply flawed. For example, the Declaration's reference to self-determination could be misrepresented as conferring a unilateral right of self-determination and possible secession, thus threatening the political unity, territorial integrity and stability of existing Member States, she said. . . . The Declaration's provisions on lands and resources would be "unworkable and unacceptable." (United Nations 2007)

The declaration remains a draft and has not been adopted by the United Nations General Assembly.

3.17.3 Existing Conditions

3.17.3.1 Waivers of the MMPA Take Moratorium

There have been few waivers of the MMPA take moratorium since passage of the MMPA (Bean 1997). This section examines past instances in which waiver of the MMPA take moratorium has been considered.

With passage of the MMPA and preemption of state management authority, the State of Alaska sought a return of management authority for 10 marine mammal species under Section 109 of the MMPA. In 1976 the Secretary of Interior returned management authority for walruses to Alaska (41 FR 14373, April 5, 1976). The Secretaries of Interior and Commerce conditionally approved Alaska's request for the other nine species in 1979 (44 FR 2540 and 2547, January 11, 1979). Alaska Natives challenged the state's ability to regulate their hunts for these species under the returned authority and prevailed in district court (*People of Togiak v. United States* 1979). In response to the court's decision Alaska returned authority for walruses to the federal government and stated its intention not to pursue management authority over the remaining species (44 FR 45565, August 2, 1979). Congress reacted by revising Section 109 to, among other things, allow financial assistance for states to develop management programs, as well as implement them. No state has sought management authority over marine mammals since Alaska's request.

In 1975 a fur importer, the Fouke Company, sought a waiver and permit to allow importation of baby fur seal skins from South Africa. NMFS granted the waiver in 1976 conditioned on harvest of the seals in South Africa not exceeding a certain level for the year. While Fouke's application for a permit was pending, it became known that the harvest level had been exceeded, so no permit was issued. Fouke applied for a permit to import skins from the following year's harvest, which NMFS granted. A federal circuit court ultimately invalidated the waiver and regulations because NMFS' decision did not meet MMPA requirements (the skins were from seals that were less than eight months old and nursing at the time of taking) (*Animal Welfare Institute v. Kreps*, 1977).

In 1985 the Safari Club International petitioned the Secretary of Commerce to adopt a rule regarding waiver of the moratorium that would include, among other provisions, a requirement that NMFS review the status of marine mammals every five years, and whenever a waiver was proposed would make a final determination within two years of the proposal. In denying this petition, NMFS stated its belief that "administrative resources can best be utilized if waiver proceedings are initiated only when there is an indication that a waiver may be appropriate or when a specific proposal is under consideration" (51 FR 16085, April 30, 1986).

NMFS waived the moratorium and published regulations governing the take of Dall's porpoise in the Japanese fishery in the Bering Sea and North Pacific in 1987 (52 FR 19,874, May 28, 1987). NMFS did not waive the moratorium and publish regulations, however, for fur seals and other marine mammals that would be taken in the fishery because of insufficient information. In invalidating NMFS' waiver and regulations, the court found that NMFS could not authorize a fishery it knew would take marine mammals not covered by the waiver and regulations (*Kokechik Fisherman's Association v. Secretary of Commerce,* 1988).

3.17.3.2 Worldwide Whaling

The following discussion describes commercial, scientific, and aboriginal subsistence whaling worldwide within the IWC context, focusing in particular on the United States' position and role in the international debates. Tables 3-47 to 3-49 and Figures 3-15 to 3-17 depict the harvest in commercial, scientific and aboriginal subsistence whaling conducted under IWC auspices since the commercial whaling moratorium became effective. Commercial whaling declined dramatically then ceased following the moratorium, and has grown steadily since the 1993/1994 season. Scientific whaling has increased steadily since 1985. Aboriginal subsistence whaling has remained fairly steady, increasing slightly since 1987.

TABLE 3-47. COMMERCIAL WHALING CATCHES SINCE 1985 (TAKEN UNDER OBJECTION TO THE MORATORIUM)

	Nation	Area	Sperm	Brydes	Minke	Total
1985/86	USSR (pelagic)	SH	0	0	3,028	3,028
	Japan (pelagic)	SH	0	0	1,941	1,941
	Total		0	0	4,969	4,969
1986 (86/87)	Norway (small type)	NA	0	0	379	379
	Japan (coastal)	NP	200	2	311	513
	Japan (Bonin Islands)	NP	0	315	0	315
	USSR (pelagic)	SH	0	0	3,028	3,028
	Japan (pelagic)	SH	0	0	1,941	1,941
	Total		200	317	5659	6,176
1987 (87/88)	Norway (small type)	NA	0	0	373	373
	Japan (coastal)	NP	188	11	304	503
	Japan (Bonin Islands)	NP	0	306	0	306
	Total		188	317	677	1,182
1993 (93/94)	Norway (small type)	NA	0	0	157	157
1994 (1994/95)	Norway (small type)	NA	0	0	206	206
1995 (1995/96)	Norway (small type)	NA	0	0	218	218
1996 (1996/97)	Norway (small type)	NA	0	0	388	388
1997 (1997/98)	Norway (small type)	NA	0	0	503	503
1998 (1998/99)	Norway (small type)	NA	0	0	625	625
1999 (1999/00)	Norway (small type)	NA	0	0	591	591
2000 (2000/01)	Norway (small type)	NA	0	0	487	487
2001 (2001/02)	Norway (small type)	NA	0	0	552	552
2002 (2002/03)	Norway (small type)	NA	0	0	634	634
2003 (2003/04)	Norway (small type)	NA	0	0	647	647
2004 (2004/05)	Norway (small type)	NA	0	0	544	544
2005 (2005/06)	Norway (small type)	NA	0	0	639	639

Source: IWC available at http://www.iwcoffice.org/_documents/table_objection.htm

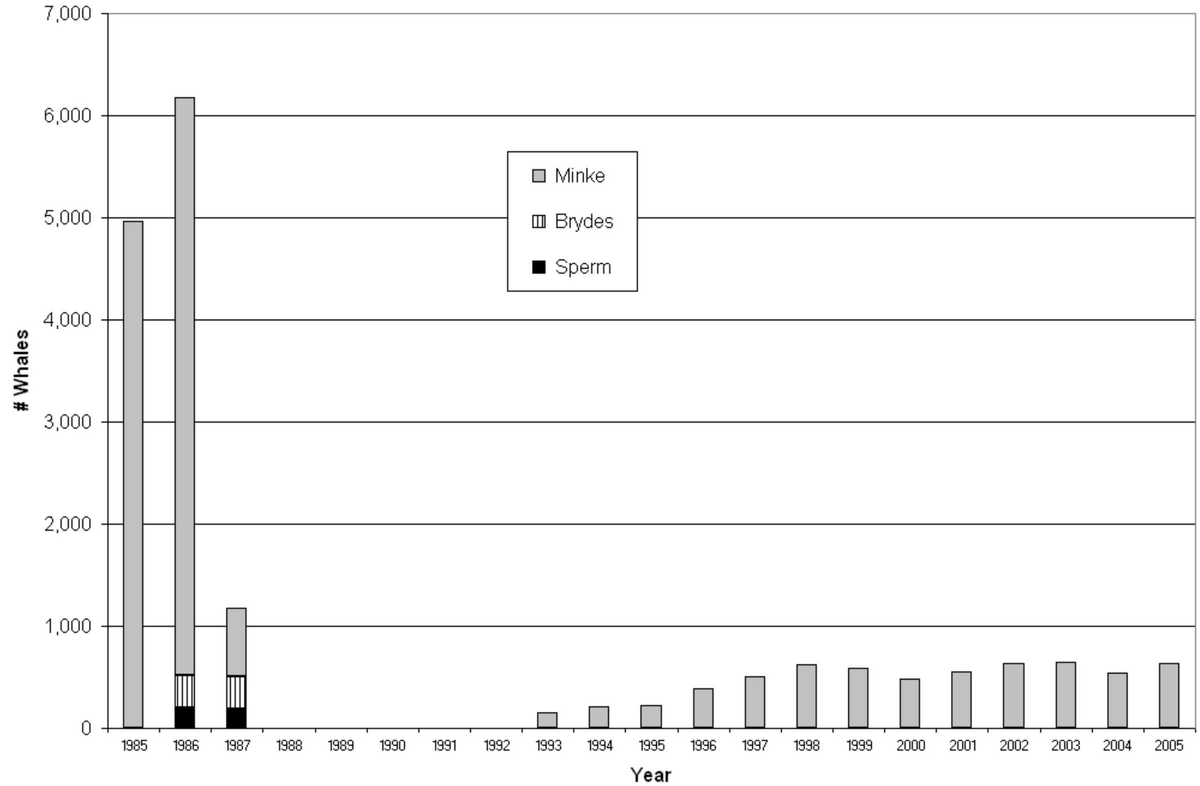


Figure 3-15. Commercial Whaling Catches by Species Since 1985

TABLE 3-48. SCIENTIFIC WHALING CATCHES SINCE 1985 (TAKEN UNDER SPECIAL PERMIT)

	Nation	Fin	Sperm	Sei	Brydes	Minke	Total
1986 (86/87)	**Iceland**	76	0	40	0	0	116
	Republic of Korea	0	0	0	0	69	69
	Total	76	0	40	0	69	185
1987 (87/88)	**Iceland**	80	0	20	0	0	100
	Japan (pelagic)	0	0	0	0	273	273
	Total	80	0	20	0	273	373
1988 (88/89)	**Iceland**	68	0	10	0	0	78

TABLE 3-48. SCIENTIFIC WHALING CATCHES SINCE 1985 (TAKEN UNDER SPECIAL PERMIT)

(CONTINUED)

	Nation	Fin	Sperm	Sei	Brydes	Minke	Total
	Japan (pelagic)	0	0	0	0	241	241
	Norway (small type)	0	0	0	0	29	29
	Total	68	0	10	0	270	348
1989 (89/90)	**Iceland**	68	0	0	0	0	68
	Japan (pelagic)	0	0	0	0	330	330
	Norway (small type)	0	0	0	0	17	17
	Total	68	0	0	0	347	415
1990 (90/91)	**Norway (small type)**	0	0	0	0	5	5
	Japan (pelagic)	0	0	0	0	327	327
	Total	0	0	0	0	332	332
1991 (91/92)	**Japan (pelagic)**	0	0	0	0	288	288
	Total	0	0	0	0	288	288
1992 (92/93)	**Norway (small type)**	0	0	0	0	95	95
	Japan (pelagic)	0	0	0	0	330	330
	Total	0	0	0	0	425	425
1993 (93/94)	**Norway (small type)**	0	0	0	0	69	69
	Japan (pelagic)	0	0	0	0	330	330
	Total	0	0	0	0	399	399
1994 (1994/95)	**Norway (small type)**	0	0	0	0	74	74
	Japan	0	0	0	0	21	21
	Japan (pelagic)	0	0	0	0	330	330
	Total	0	0	0	0	425	425
1995 (1995/96)	**Japan**	0	0	0	0	100	100
	Japan (pelagic)	0	0	0	0	440	440
	Total	0	0	0	0	540	540

TABLE 3-48. SCIENTIFIC WHALING CATCHES SINCE 1985 (TAKEN UNDER SPECIAL PERMIT) (CONTINUED)

	Nation	Fin	Sperm	Sei	Brydes	Minke	Total
1996 (1996/97)	**Japan**	0	0	0	0	77	77
	Japan (pelagic)	0	0	0	0	440	440
	Total	0	0	0	0	517	517
1997 (1997/98)	**Japan**	0	0	0	0	100	100
	Japan (pelagic)	0	0	0	0	438	438
	Total	0	0	0	0	538	538
1998 (1998/99)	**Japan**	0	0	0	1	100	101
	Japan (pelagic)	0	0	0	0	389	389
	Total	0	0	0	1	489	490
1999 (1999/2000)	**Japan**	0	0	0	0	100	100
	Japan (pelagic)	0	0	0	0	439	439
	Total	0	0	0	0	539	539
2000 (2000/01)	**Japan**	0	5	0	43	40	88
	Japan(pelagic)	0	0	0	0	440	440
	Total	0	5	0	43	480	528
2001 (2001/02)	**Japan**	0	8	1	50	100	159
	Japan(pelagic)	0	0	0	0	440	440
	Total	0	8	1	50	540	599
2002 (2002/03)	**Japan (pelagic)**	0	5	40	50	102	197
	Japan (coastal)	0	0	0	0	50	50
	Japan (pelagic)	0	0	0	0	441	441
	Total	0	5	40	50	593	688
2003 (2003/04)	**Iceland**	0	0	0	0	37	37
	Japan (pelagic)	0	10	50	50	101	211

TABLE 3-48. SCIENTIFIC WHALING CATCHES SINCE 1985 (TAKEN UNDER SPECIAL PERMIT)

(CONTINUED)

	Nation	Fin	Sperm	Sei	Brydes	Minke	Total
	Japan (coastal)	0	0	0	0	50	50
	Japan (pelagic)	0	0	0	0	443	443
	Total	0	10	50	50	631	741
2004 (2004/05)	**Iceland**	0	0	0	0	25	25
	Japan (pelagic)	0	3	100	51	100	254
	Japan (coastal)	0	0	0	0	60	60
	Japan (pelagic)	0	0	0	0	441	441
	Total	0	3	100	51	626	780
2005 (2005/06)	**Iceland**	0	0	0	0	39	39
	Japan (pelagic)	0	5	100	50	101	256
	Japan (coastal)	0	0	0	0	121	121
	Japan (pelagic)	10	0	0	0	856	866
	Total	10	5	100	50	1,117	1,282

Source: IWC available at http://www.iwcoffice.org/_documents/table_permit.htm

TABLE 3-43. ABORIGINAL SUBSISTENCE WHALING CATCHES SINCE 1985 (CONTINUED)

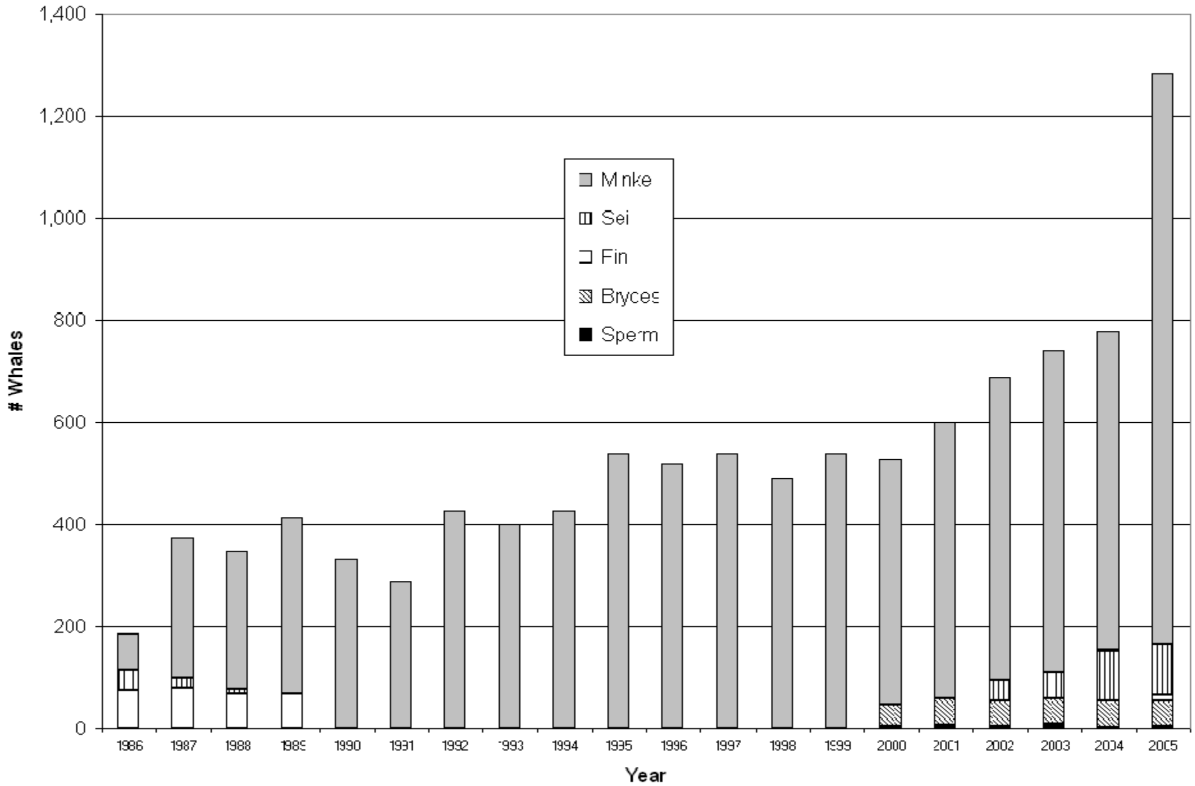


Figure 3-16. Scientific Whaling Catches by Species since 1985

1

2 **TABLE 3-49. ABORIGINAL SUBSISTENCE WHALING CATCHES SINCE 1985**

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
1985	**Denmark: W. Greenland**	9	8	0	0	222	0	239
	Denmark: E. Greenland	0	0	0	0	14	0	14
	USSR	0	0	0	169	0	0	169
	USA	0	0	0	1	0	17	18
	Total	9	8	0	170	236	17	440
1986	**Denmark: W. Greenland**	9	0	0	0	145	0	154
	Denmark:	0	0	0	0	2	0	2

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
	E. Greenland							
	St. Vincent	0	2	0	0	0	0	2
	USSR	0	0	0	169	0	0	169
	USA	0	0	0	2	0	28	30
	Total	9	2	0	171	147	28	357
1987	**Denmark: W. Greenland**	9	0	0	0	86	0	95
	Denmark: E. Greenland	0	0	0	0	4	0	4
	St. Vincent	0	2	0	0	0	0	2
	USSR	0	0	0	158	0	0	158
	USA	0	0	0	0	0	31	31
	Total	9	2	0	158	90	31	290
1988	**Denmark: W. Greenland**	9	1	0	0	109	0	119
	Denmark: E. Greenland	0	0	0	0	10	0	10
	St. Vincent	0	1	0	0	0	0	1
	USSR	0	0	0	150	0	0	150
	USA	0	0	0	1	0	29	30
	Total	9	2	0	151	119	29	310
1989	**Denmark: W. Greenland**	14	2	2	0	63	0	81
	Denmark: E. Greenland	0	0	0	0	10	0	10
	USSR	0	0	0	179	0	0	179
	USA	0	0	0	1	2	26	29
	Total	14	2	2	180	75	26	299

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
1990	**Denmark: W. Greenland**	19	1	0	0	89	0	109
	Denmark: E. Greenland	0	0	0	0	6	0	6
	USSR	0	0	0	162	0	0	162
	USA	0	0	0	0	0	44	44
	Total	19	1	0	162	95	44	321
1991	**Denmark: W. Greenland**	18	0	0	0	99	0	117
	Denmark: E. Greenland	0	1	0	0	7	0	8
	USSR	0	0	0	169	0	0	169
	Canada	0	0	0	0	0	1	1
	USA	0	0	0	0	0	46	46
	Total	18	1	0	169	106	47	341
1992	**Denmark: W. Greenland**	22	1	0	0	103	0	126
	Denmark: E. Greenland	0	0	0	0	11	0	11
	St. Vincent	0	2	0	0	0	0	2
	Russia	0	0	0	0	0	0	0
	USA	0	0	0	0	0	50	50
	Total	22	3	0	0	114	50	189
1993	**Denmark: W. Greenland**	14	0	0	0	107	0	121
	Denmark: E. Greenland	0	0	0	0	9	0	9
	St. Vincent	0	2	0	0	0	0	2
	USA	0	0	0	0	0	52	52

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
	Total	14	2	0	0	116	52	184
1994	**Canada**	0	0	0	0	0	1	1
	Denmark: W. Greenland	22	1	0	0	104	0	127
	Denmark: E. Greenland	0	0	0	0	5	0	5
	Russia	0	0	0	44	0	0	44
	USA	0	0	0	0	0	46	46
	Total	22	1	0	44	109	47	223
1995	**Denmark: W. Greenland**	12	0	0	0	153	0	165
	Denmark: E. Greenland	0	0	0	0	9	0	9
	Russia	0	0	0	90	0	0	90
	USA	0	0	0	2	0	57	59
	Total	12	0	0	92	162	57	323
1996	**Canada**	0	0	0	0	0	1	1
	Denmark: W. Greenland	19	0	0	0	164	0	183
	Denmark: E. Greenland	0	0	0	0	12	0	12
	St. Vincent	0	1	0	0	0	0	1
	Russia	0	0	0	43	0	0	43
	Canada	0	0	0	0	0	1	1
	USA	0	0	0	0	0	44	44
	Total	19	1	0	43	176	46	285
1997	**Denmark: W. Greenland**	13	0	0	0	148	0	161

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
	Denmark: E. Greenland	0	0	0	0	14	0	14
	Russia	0	0	0	79	0	0	79
	USA	0	0	0	0	0	66	66
	Total	13	0	0	79	162	66	320
1998	**Canada**	0	0	0	0	0	1	1
	Denmark: W. Greenland	11	0	0	0	166	0	177
	Denmark: E. Greenland	0	0	0	0	10	0	10
	St. Vincent	0	2	0	0	0	0	2
	Russia	0	0	0	125	0	1	126
	USA	0	0	0	0	0	54	54
	Total	11	2	0	125	176	56	370
1999	**Denmark: W. Greenland**	9	0	0	0	170	0	179
	Denmark: E. Greenland	0	0	0	0	15	0	15
	St. Vincent	0	2	0	0	0	0	2
	Russia	0	0	0	123	0	1	124
	USA	0	0	0	1	0	47	48
	Total	9	2	0	124	185	48	368
2000	**Canada**	0	0	0	0	0	1	1
	Denmark: W. Greenland	7	0	0	0	145	0	152
	Denmark: E. Greenland	0	0	0	0	10	0	10
	St. Vincent	0	2	0	0	0	0	2

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
	Russia	0	0	0	115	0	1	116
	USA	0	0	0	0	0	47	47
	Total	7	2	0	115	155	49	328
2001	**Denmark: W. Greenland**	8	2	0	0	139	0	149
	Denmark: E. Greenland	0	0	0	0	17	0	17
	St. Vincent	0	2	0	0	0	0	2
	Russia	0	0	0	112	0	1	113
	USA	0	0	0	0	0	75	75
	Total	8	4	0	112	156	76	356
2002	**Canada**	0	0	0	0	0	1	1
	Denmark: W. Greenland	13	0	0	0	139	0	152
	Denmark: E. Greenland	0	0	0	0	10	0	10
	St. Vincent	0	2	0	0	0	0	2
	Russia	0	0	0	131	3	0	134
	USA	0	0	0	0	0	50	50
	Total	13	2	0	131	152	51	349
2003	**Denmark: W. Greenland**	9	1	0	0	185	0	195
	Denmark: E. Greenland	0	0	0	0	14	0	14
	St. Vincent	0	1	0	0	0	0	1
	Russia	0	0	0	128	0	3	131
	USA	0	0	0	0	0	48	48
	Total	9	2	0	128	199	51	389

	Nation	Fin	Humpback	Sei	Gray	Minke	Bowhead	Total
2004	**Denmark: W. Greenland**	13	1	0	0	179	0	193
	Denmark: E. Greenland	0	0	0	0	11	0	11
	St. Vincent	0	0	0	0	0	0	0
	Russia	0	0	0	111	0	1	112
	USA	0	0	0	0	0	43	43
	Total	13	1	0	111	190	44	359
	2005	13	0	0	0	176	0	189
	Denmark: E. Greenland	0	0	0	0	4	0	4
	St. Vincent	0	1	0	0	0	0	1
	Russia	0	0	0	124	0	2	126
	USA	0	0	0	0	0	68	68
	Total	13	1	0	124	180	70	388

Source: IWC available at http://www.iwcoffice.org/_documents/table_aboriginal.htm

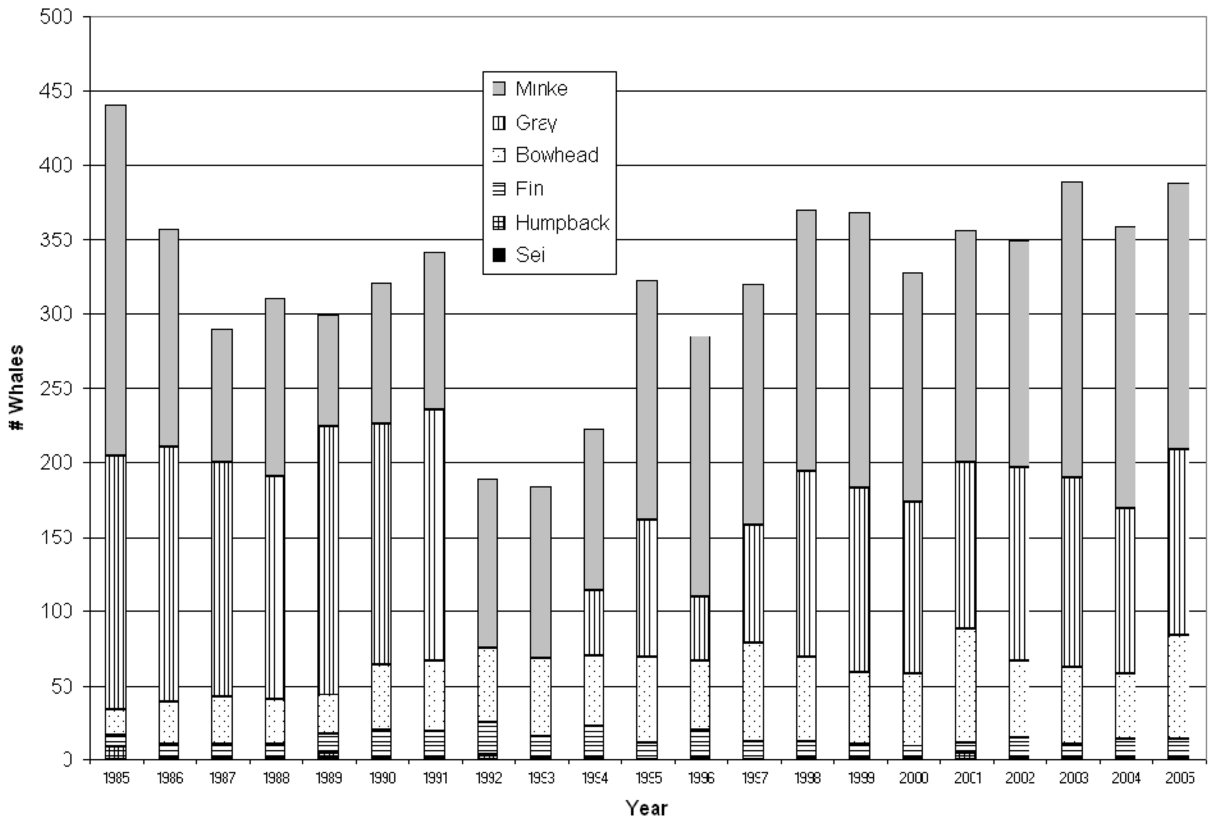


Figure 3-17. Aboriginal Subsistence Whaling Catches by species since 1985

3.17.3.2.2 Commercial and Scientific Whaling

The United States was a leader in establishing the 1982 moratorium on commercial whaling (Stoett 1997:65). In 1949, the United States passed the WCA, banning all commercial whaling by United States nationals. Congress adopted resolutions requesting the Secretary of State to negotiate a ten-year moratorium on the commercial killing of whales in the international arena (16 USC 916 note, Public Law 96-60, August 15, 1979, 93 Stat. 403). In 1972, the first United Nations Conference on the Human Environment in Stockholm adopted a resolution calling for such a moratorium. The United States lobbied at each subsequent IWC annual meeting for incorporation of the moratorium into IWC regulations, until its eventual adoption.

Prior to adoption of the moratorium, the Secretary of Commerce certified a number of countries under the Pelly Amendment finding their whaling activities diminished the effectiveness of the ICRW. In 1974, the Secretary of Commerce issued the first certifications under the Pelly Amendment directed at Japan and the Soviet Union for whaling in excess of IWC quotas. In

1978, the Secretary of Commerce certified Chile, Peru and the Republic of Korea under the Pelly Amendment for their whaling practices.

In 1982, when the commercial whaling moratorium was adopted, Japan, Peru, Norway, and the Soviet Union all lodged objections. In response to Japan's objection to the moratorium and continued commercial whaling, the United States threatened to end Japanese access to fishing in United States waters under the Packwood-Magnuson Amendment. Japan withdrew its objection to the moratorium by 1988, and Peru withdrew its objection in 1983. The Soviet Union conducted pelagic commercial whaling of minke whales in the southern hemisphere through the 1985/1986 season. The Soviet Union never withdrew its objection, but stopped harvesting whales commercially since 1986. The Russian Federation, successor state to the Soviet Union, has not engaged in commercial whale harvest.

When Norway objected to the moratorium and conducted small type coastal whaling in the 1986 and 1987 seasons, the Secretary of Commerce certified Norway under the Pelly Amendment; in 1987 Norway suspended its whaling. The Secretary of Commerce also certified Norway in 1990 and 1992 for its research whaling program. Norway then resumed commercial whaling in 1993, and was again certified by the Secretary of Commerce under the Pelly Amendment (Clinton 1993; Ek 1996). President Clinton did not impose trade sanctions, and explained in a letter to Congress that while "[t]he United States is deeply opposed to commercial whaling . . . [there is] an equally strong commitment to science-based international solutions to global conservation problems" (Clinton 1993). Clinton acknowledged that "not every country agrees with our position against commercial whaling," and initiated preparations for sanctions, but ultimately concluded that "the primary interest of the United States [is in] protecting the integrity of the IWC and its conservation regime," which could best be achieved through diplomatic measures (Clinton 1993). Norway remains certified under the Pelly Amendment Norway is the only original objecting party that still conducts commercial whaling under objector status. The IWC has passed numerous resolutions asking the government to reconsider its objection and immediately halt all whaling under its jurisdiction (see e.g., IWC Resolutions 1995-5, 1996-5, 1997-3, and 2001-5).

The Secretary of Commerce certified Japan's scientific whaling program in 1988, when Japan initiated its Antarctic program to harvest minke whales, in 1995, after Japan extended its minke whale program to the North Pacific, and in 2000 when Japan expanded its scientific whaling operations to include protected Bryde's and sperm whales. The Secretary stated that the United States government was "deeply concerned that the real aim of this large hunt is to pave the way for an outright resumption of commercial whaling (Mineta 2000)". Japan remains certified under the Pelly Amendment.

Iceland did not lodge an objection to the commercial whaling moratorium in 1982, but subsequently disagreed with maintenance of the ban and withdrew from the IWC in 1992. In 2002 Iceland was successful in obtaining re-admission to the IWC but lodged a reservation to the moratorium. The reservation language provides that Iceland will not authorize whaling for commercial purposes before 2006, after which it will not authorize whaling while progress is being made in negotiations on the management of commercial whaling. Iceland announced its intent on October 17, 2006 to resume commercial whaling for minke and fin whales (Black 2006a; Fenner 2006). As of November 3, 2006, Icelandic whalers had killed seven fin whales and one minke whale (NOAA Public Affairs 2006). The United States, along with 17 other countries, objected to Iceland's reservation to the moratorium when it was re-admitted to the IWC in 1992. When Iceland resumed commercial whaling in 2006, the United States joined 24 other countries in lodging formal objections with the government of Iceland. The Secretary of Commerce also certified Iceland under the Pelly Amendment in 2004, and the certification remains in effect, though no trade sanctions have been imposed. In August 2007, Iceland announced it would not issue new whale-hunting quotas until market demand increased and it received an export license from Japan (Oafsdottir 2007)

The future of the moratorium on commercial whaling remains uncertain. The consistent position of the United States has been that the moratorium should not be lifted at least until a revised management scheme is in place (Department of State 2003), and has participated in good faith in negotiating such a scheme. At the same time, the IWC confirmed its view as recently as the annual meeting in St. Kitts and Nevis in 2006 that discussions on the revised management scheme remain at an impasse (IWC 2006b). At that meeting a slight majority of IWC member nations adopted a resolution declaring the commercial whaling moratorium no longer necessary (IWC Resolution 2006-1, 'St Kitts and Nevis Declaration'). Yet at the 2007 IWC meeting in Anchorage, 37 countries adopted a resolution stating that the whaling ban "remains valid" (IWC 2007b). While slight majorities within the IWC have thus succeeded in adopting contradictory resolutions regarding the commercial whaling moratorium, (resolutions are nonbinding) definitive action on the commercial moratorium (or the revised management scheme) is uncertain because neither the pro-commercial-whaling or anti-commercial-whaling sides of the debate have the three-fourths majority necessary for action (Henderson 2005; Hogarth 2006). Intensive discussions at a recent intersessional meeting of the IWC identified a number of issues that may help improve discussions, negotiations, and trust within the IWC (Hogarth 2008).

3.17.3.2.3 Aboriginal Subsistence Whaling

Although aboriginal subsistence whaling was not controversial in the IWC through the mid-1970s, since that time several issues have arisen. One debate has focused on the sustainability of aboriginal subsistence harvests. Examples of harvests that have generated controversy include bowheads by Alaska Natives and harvest of minke and fin whales by Native Greenlanders. Bowheads are listed as endangered under the ESA and listed in Appendix I of CITES (Section 1.4.1.2.1, Relevant Overview of Requests for Bowhead Whales on Behalf of Alaska Eskimos). In the early 1970s, the IWC Scientific Committee expressed concern about the status of the bowhead whale stock, and at the 1977 annual meeting of the IWC, recommended that the catch limit for aboriginal subsistence harvest of bowheads be set at zero (accepted by the IWC with a vote of 16-0, with the United States abstaining). In a subsequent special meeting in 1977, the United States and the Alaska Eskimo Whaling Commission presented a request to modify the ban and allow for a take of bowhead by Alaska Eskimos. Although the Scientific Committee rejected the proposal, the IWC plenary session allowed for a limited and strictly controlled hunt for 1978. Work on the bowhead aboriginal subsistence hunts continued in workshops and working groups following the special meeting. Some argued that the United States, by supporting an aboriginal hunt contrary to scientific advice regarding the conservation status of the stock, undermined the conservation arguments the United States and the IWC used to maintain the commercial moratorium (Hankins 1990). Continuous research since then has addressed questions regarding sustainability of a bowhead harvest.

Native Greenlanders harvest North Atlantic minke and fin whales, which are classified as protection stocks under the IWC Schedule. For a number of years, the IWC Scientific Committee has been unable to provide scientific advice to the IWC on safe catch limits because of lack of information regarding stock structure and minimum stock level, although this changed in 2007 with more solid data and advice on sustainable catch limits. (IWC 2007b).

Commercial whaling proponents have pointed to the IWC's approval of aboriginal subsistence whaling in support of commercial whaling, arguing the same conservation standards should apply to both. The High North Alliance, a group of nations that support resumption of commercial whaling, points to the Greenlander hunt, arguing that the IWC process with respect to aboriginal subsistence whaling is flawed. According to their website, they urge that all whaling be managed under the same management objectives (High North Alliance 2007). Debate in the IWC over aboriginal subsistence whaling also centers on what groups of people qualify as aboriginal subsistence whalers, what manner of hunting qualifies as aboriginal subsistence hunting, and what use of the products of the hunt qualifies as subsistence use. Criticisms come from those who support commercial whaling and argue for equal consideration, and from animal rights groups opposed to all forms of whaling or concerned that aboriginal hunting methods result in inhumane killing. Criticisms have been leveled at the Greenlander, Bequian, Chukotkan, Alaska Native and Makah hunts based on arguments that the hunters are not aborigines, that the manner of hunting is not aboriginal, or that the use of the products is not subsistence use.

Some critics have noted that the hunts of Greenlanders are particularly difficult to distinguish from commercial whaling due to the close integration of hunting and fishing activities and waged employment (Dahl 1989; Stevenson et al. 1997), plus the sale of *mattak* and other surplus whale products on the Greenland market (Dahl 1989; Heide-Jørgensen 1994; Australian National Task Force on Whaling 1997:29; Johansen 1997; High North Alliance 2007).

The Bequian harvest is an offshoot of New England-based whale fisheries that operated in the West Indies in the mid-1700s (Reeves 2002). Meat from humpbacks is still considered highly palatable by the Afro-Caribbean population of St. Vincent and the Grenadines, and meat for local consumption appears to be the principal incentive for whaling, although products from the hunts (especially oil) are also sold on the wider regional market (Caldwell and Caldwell 1975; Australian National Task Force on Whaling 1997:29; Reeves 2002). The Bequian harvest of humpback whales was limited to a few whales by primarily one person for several years, and was originally intended to be phased out. At the IWC annual meeting in 1996, however, St. Vincent and the Grenadines reported that a new whaler had taken up humpback whaling, causing concern on the part of some delegates (IWC 1997).

The Chukotkan hunt has raised concerns about the use of products from the hunt, since the blubber and some other gray whale components were being used as food in fox fur farms (IWC 1996; Australian National Task Force on Whaling 1997).

The 'subsistence use' definition formally adopted by the IWC includes the barter, trade or sharing of whale products primarily within the local community, and allows for the sale of handicrafts made from whale products. Commercial whaling proponents argue that this creates a double standard and that sharing, bartering and trading meat amounts to commerce (Stoett 1997). Alaska Eskimos are allowed to sell native articles of handicraft from bowhead whales within the borders of the United States under the provisions of the MMPA, and the restrictions were similar for the 1998 through 2000 Makah hunts, as well as the current proposed action. In the past questions have been raised about whether the Makah harvest was a subsistence harvest because their original 1995 formal request to resume hunting of ENP gray whales stated that the Makah were reserving what they consider their treaty-secured right to whale for commercial purposes. They classified their ceremonial and subsistence request as 'interim.' The present request does not include such a statement.

The legitimacy of the Makah request has also been questioned because of the Tribe's 70- to 80-year hiatus in whaling. (Section 1.1.4., Summary of Makah Tribe's Historic Whaling Tradition, describes the reasons for the hiatus.) The 1981 *Ad Hoc* Technical Working Group's working definition of 'aboriginal subsistence whaling' refers to a "continuing traditional dependence" on whale products for subsistence (Section 3.17, Regulatory Overview; Section 1.4.1.2.1., Relevant Overview of Requests for Bowhead Whales on Behalf of Alaska Eskimos; Section 1.4.1.2.2., Overview of Requests for ENP Gray Whales on Behalf of the Makah). While other aboriginal subsistence whalers have had smaller breaks in subsistence tradition (e.g., the Chukotkans stopped whaling for a few years in the 1990s), no other group has had a break lasting for more than a generation.

Additional controversy was generated over the legitimacy of the Makah hunt as an aboriginal subsistence hunt when the IWC adopted Schedule language stating that products from the hunt "were to be used exclusively for local consumption by the aborigines whose traditional aboriginal subsistence and cultural needs have been recognized" (IWC 1997)(Section 1.4.1.2.2., Overview of Requests for ENP Gray Whales on Behalf of the Makah). Some observers asserted that "the more flexible the aboriginal subsistence whaling definitions become, the more susceptible the IWC will be to unyielding pressure by other communities with traditions of harvesting and using whales for commercial purposes" (Jenkins and Romanzo 1998). This issue became moot when the words "whose traditional aboriginal subsistence and cultural needs have been recognized" were deleted from Schedule 13 (Section 1.4.1.2.2., Overview of Requests for ENP Gray Whales on Behalf of the Makah).

Beginning in 1986, Japan argued that its coastal villages should be allowed to whale under the aboriginal subsistence whaling exception, also requesting that the sale of meat from the hunt be allowed on the open market. At the IWC meeting in 2002, Japan and other pro-whaling parties withheld support for the United States' request for a bowhead quota for the years 2003 through

2007, but did not oppose the joint request of the Russian Federation and the United States for gray whales. Later that year at a special meeting, Japan and others approved catch limits for bowheads through 2007, and the United States voted in favor of a resolution regarding Japan's plan for small type coastal whaling if it was non-commercial and based on scientific advice. That resolution did not pass.

At the 2007 IWC meeting in Anchorage, Japan continued to press for an allowance for coastal whaling. In a statement to the press, Japan's Commissioner argued that small type coastal whaling is no different from aboriginal subsistence whaling and accused IWC members of imposing a "double standard" (Hopfinger 2007). Prior to the meeting, the Japanese Commissioner stated that Japan would not oppose the Alaska Eskimo quota, while the United States Commissioner was quoted in the Anchorage papers saying the United States would strike no deals with Japan even if Japan opposed the bowhead quota (deMarban 2007). The United States' request for updated bowhead catch limits and the joint request of the Russian Federation and United States for gray whale catch limits were approved by consensus.

Outside the IWC forum or any international regulatory regime, aboriginal subsistence hunting occurred for hundreds to thousands of years. See Section 3.4.3.6.1, Aboriginal Subsistence Whaling, for a list of tribes engaged in historic aboriginal hunts of ENP gray whales from California to Alaska and Chukotka. More recently, aboriginal subsistence hunts of whales is known to continue, or to have continued until recently, in three tropical areas: (1) humpback whale hunts in Equatorial Guinea, (2) sperm whale and other species in Indonesia, and (3) Bryde's whales in the Philippines. The humpback whale hunt off the island of Pagalu in the Gulf of Guinea is thought to have been introduced by American ship-based whalers in the 18th and 19th centuries (Reeves 2002). Natives target humpback calves, with an estimated catch level of 3 or fewer humpbacks per year (Aguilar 1985; Reeves 2002). Whale hunts for sperm whales and other whales off two Indonesian islands predates the arrival of American and English whalers by at least two centuries (Barnes 1991; Barnes 1996). Fishing, including whaling, is the principal source of sustenance, and whale products, including meat and oil, are sold at local markets (Barnes 1991; Barnes 1996; Reeves 2002). One group of natives has mainly targeted sperm whales in the large whale catch for recent years, totaling a catch of 664 whales from 1959 to 1995, while another group of natives seems to target mostly baleen whales, including fin, sei, and minke whales (Barnes 1969; Reeves 2002). Both groups also hunt small cetaceans. Bryde's whales were the main targeted species in the Philippines until the last documented catch in 1996, when a Philippine administrative order expanded the prohibition on killing dolphins to include all cetaceans (Reeves 2002). Whale hunting origins among fishermen ranged from 100 years to opportunistic hunting in the last few generations.

Although the United States has consistently supported sustainable aboriginal subsistence whaling, it objected to Canada's authorization of a bowhead hunt by Inuit hunters. In 1996 the Commerce Secretary certified Canada under the Pelly Amendment for allowing Inuit hunters to take two bowhead whales. The Secretary's certification stated that "[t]he United States supports aboriginal whaling when it is managed through the International Whaling Commission, the global body charged with responsibility for the international conservation and management of whale stocks and the regulation of whaling" (NOAA Press Release 96-r194, December 18, 1996). Canada withdrew from the IWC in 1982.

3.17.3.3 Ceremonial and Subsistence Practices of Indigenous People

Indigenous people inhabit large areas of the earth's surface from the Arctic to the South Pacific, numbering roughly 300 million. In a Fact Sheet, the United Nations High Commissioner for Refugees provides the following information:

> [T]hey are the descendants - according to one definition - of those who inhabited a country or a geographical region at the time when people of different cultures or ethnic origins arrived, the new arrivals later becoming dominant through conquest, occupation, settlement or other means. Among many indigenous peoples are the Indians of the Americas (for example, the Mayas of Guatemala or the Aymaras of Bolivia), the Inuit and Aleutians of the circumpolar region, the Saami of northern Europe, the Aborigines and Torres Strait Islanders of Australia, and the Maori of New Zealand. Indigenous people often retain social, cultural, economic and political characteristics that are clearly distinct from those of the other segments of the national populations (UNHCR 1995).

The cultures of indigenous people may be threatened by the dominant society. In many parts of the world indigenous people are actively seeking recognition of their identities and ways of life.

With its history of religious tolerance and protection of individual freedoms through the Constitution, the United States considers itself a world leader in its respect for the practices of native people. It has not, however, supported the broad claims for self-determination often associated with the international indigenous rights movement. For example, the United States has not joined the International Labour Organisation Convention 169 on the Rights of Indigenous Peoples and expressed numerous reservations to the United Nations Declaration on the Rights of Indigenous People (Section 3.17.2.6, International Law Regarding Indigenous People).

Chapter 4 Environmental Consequences

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter examines the potential direct and indirect effects of the six alternatives on each of the resources considered in this EIS. Direct effects are those that are caused by the action and occur at the same time and place, while indirect effects are those that are caused by the action but occur later in time and are reasonably foreseeable. Both adverse and beneficial effects are considered.

Chapter 2 described the No-action Alternative and five action alternatives and Chapter 3 described the current condition of the resources that may be affected by the alternatives. The present Chapter evaluates the direct and indirect effects each alternative is likely to have on each resource. Chapter 5 will address any cumulative effects that might occur when the direct and indirect effects of any of the alternatives are considered in the context of past actions, other contemporaneous actions, or reasonably foreseeable future actions.

For each resource, Chapter 3 included a regulatory overview, providing information about how that resource is managed, which informs the criteria presented in this Chapter for evaluating effects of the alternatives. This information was provided as background and it is not the purpose of this EIS to reach conclusions about whether the alternatives might meet all regulatory requirements. Rather, the focus of this EIS is to inform decisions regarding whether to waive the MMPA prohibition on take or to authorize whaling under the WCA. Once NMFS selects an action, it will make any necessary determinations required by applicable laws in accord with the processes and procedures of those laws.

The five action alternatives examined in this EIS vary in the total number of whales that may be harvested, the number of identified whales from the PCFA survey area that may be harvested, and the timing and location of hunting. These principal components (described in Section 2.2, Alternative Development Process) are likely to influence the time of year the Tribe would hunt, the number of days the Tribe would hunt, and the probability that the Tribe would harvest the total number of whales allowed. Also relevant to the analysis of effects is the number of whales subjected to harpoon attempts, the number of whales approached by Makah vessels, and the number of rifle shots or grenade explosions under each alternative. Table 4-1 contains the same information regarding these principal components as that contained in Table 2-1, Primary Differences Among Alternatives, and also includes additional estimates of (1) the number of approaches and unsuccessful harpoon attempts (2) the number of rifle shots or grenade explosions, and (3) the number of days of hunting that would occur if a hunt were approved under any of the action alternatives. The estimate of when and how often the Tribe would hunt under any alternative is also relevant to analyzing the effects of other activities associated with hunting, such as the operation of vessels and aircraft, and protest and media-related activities.

The following discussion explains the basis for the assumptions about the most likely time hunting would occur, the number of days of hunting, the number of whales approached and the number subjected to harpoon attempts. It is impossible to predict any of these parameters with certainty, but including them in the analysis helps make the analysis – and the comparison among alternatives – more concrete and specific.

TABLE 4-1. PRIMARY DIFFERENCES AMONG ALTERNATIVES, AND ASSOCIATED ASSUMPTIONS FOR ANALYSIS

WHALE HUNTING COMPONENTS		ALTERNATIVES: 1 NO-ACTION	2 PROPOSED ACTION	3 HUNT OUTSIDE STRAIT, NO TIMING RESTRICTIONS, NO IDENTIFIED WHALE LIMITS	4 SANCTUARY AND NATIONAL WILDLIFE REFUGE RESOURCE ALTERNATIVE	5 HUNT OUTSIDE STRAIT, NO TIMING RESTRICTIONS, MORE RESTRICTIVE NUMBERS, NO IDENTIFIED WHALE LIMITS	6 HUNT ANYWHERE IN U&A, NO TIMING RESTRICTIONS, NO IDENTIFIED WHALE LIMITS
Hunt timing		Not authorized	December 1 through May 31	January 1 through December 31	Same as Alternative 2	Same as Alternative 3	Same as Alternatives 3, 5
Hunt area		None	U&A west of Bonilla-Tatoosh line1	Same as Alternative 2	Same as Alternatives 2, 3, except would prohibit hunting within 200 yards of rocks and islands at all times	Same as Alternatives 2, 3	Entire U&A
Maximum limit for harvested, struck, and struck and lost whales	Annual	0	Up to 5 harvested, 7 struck, and 3 struck and lost	Same as Alternative 2	Same as Alternatives 2, 3	Up to 2 harvested, 3 struck, and 1 struck and lost	Same as Alternatives 2, 3, 4
	Five-year period	0	Up to 20 harvested, 35 struck, and 15 struck and lost	Same as Alternative 2	Same as Alternatives 2, 3	Up to 10 harvested, 15 struck, and 5 struck and lost	Same as Alternatives 2, 3, 4
Additional limits for identified whales		Not applicable	Yes	No	Same as Alternative 2	Same as Alternative 3	Same as Alternatives 3, 5
Analysis Assumptions, Based on the Above							
Assumed number of whales with harpoon attempts and approaches	Annual	0	Up to 28 exposed to harpoon attempts, 140 approached	Same as Alternative 2	Same as Alternatives 2, 3	12 exposed to harpoon attempts, 60 approached	Same as Alternatives 2, 3, 4
	Five-year period	0	Up to 140 exposed to harpoon attempts, 700 approached	Same as Alternative 2	Same as Alternatives 2, 3	60 exposed to harpoon attempts, 300 approached	Same as Alternatives 2, 3, 4
Assumed number of rifle shots		0	28	Same as Alternative 2	Same as Alternatives 2, 3	12	Same as Alternatives 2, 3, 4
Assumed number of grenade explosions		0	21	Same as Alternative 2	Same as Alternatives 2, 3	9	Same as Alternatives 2, 3, 4
Assumed number of hunting days		0	7-30 days per year	40 days	Same as Alternative 2	20 days	Same as Alternative 3

1 U&A west of Bonilla-Tatoosh line is the Makah Tribe's U&A fishing grounds off the coast of Washington and west of the Bonilla-Tatoosh line, excluding the Strait of Juan de Fuca. See Figure 1-1.

2 The entire Makah Tribe U&A includes the Strait of Juan de Fuca and waters off the coast of Washington, as adjudicated by *United States v. Washington* (1974 and 1985). See Figure 1-1.

4.1.1 Alternative 1

Under Alternative 1, NMFS would not authorize a Makah gray whale hunt. The current annual and five-year IWC catch limits set by the IWC for ENP gray whales are based on a joint request of the Russian Federation and the United States. The catch limit set by the IWC is 620 whales over the five-year period (2008 through 2012), with no more than 140 whales taken in any one year. A bilateral agreement between the Russian Federation and the United States, renewed each year, allocates those totals between the two countries. If NMFS does not authorize a Makah gray whale hunt, or authorizes a hunt for fewer whales than provided in the bilateral agreement, the Russian Federation could authorize the Chukotka Natives to take any of the unused catch limit. Because of this possibility, although the alternatives considered in this EIS may result in the Makah Tribe harvesting different levels of ENP gray whales, the overall harvest is likely to be the same regardless of the alternative selected (that is, the total allowed under the IWC schedule).

Beyond 2012, if NMFS did not authorize a Makah gray whale hunt, it is reasonable to expect that the Russian Federation would request a renewal of the ENP gray whale catch limit of at least 620 whales over five years, consistent with their representations at the 2007 IWC meeting that their needs are more than currently provided for under the existing allocation (IWC 2007c).

4.1.2 Alternative 2

The Makah Tribe proposed Alternative 2, which would allow harvest of four whales per year on average (with a maximum of five in any one year) and up to 20 whales in a five-year period. Hunting would be allowed in the Tribe's U&A outside the Strait of Juan de Fuca from December 1 to May 31. Hunting would not be allowed within 200 yards of Tatoosh Island and White Rock.

The number of whales that could be struck would be limited to no more than seven in any calendar year and no more than 35 over the five-year period, while the number of whales struck and lost would be limited to three annually and 15 over the five-year period. The maximum number of whales struck in any year would be seven, and the maximum number struck and lost would be three. Assuming struck and lost whales are killed, the maximum number of whales that might be killed each year under Alternative 2 would be seven (that is, the seven-strike limit would be the limiting number) (Table 4-1, Primary Differences among Alternatives, and Associated Assumptions for Analysis).

The hunting season under this alternative could occur during periods of cold weather, storms, and rough seas from December through March. These months have significantly more rain and slightly more fog (both of which affect visibility) than April and May (Table 3-42). Also, as described in Section 3.15.3.2.2 (Description of Weather and Sea Conditions in the Project Area), wave heights show a wider range of variability during the months of December through March, when peak wave heights may exceed 30 feet (compared to peak wave heights near 20 feet during April and May; Figure 3-14). April and May are also slightly warmer than the winter months and less windy. For example, gale-force winds occur six times more frequently in January, compared to April (Table 3-42).

Southbound migrating whales have been observed in the project area in December, and Rugh et al. (2001) estimated January 5 as the peak of the southward migration at Tatoosh Island (Section 3.4.3.1.4, Seasonal Migrations). While gray whales are present in the project area during December and January, they are likely traveling more quickly and farther offshore than northbound migrants in the spring (Section 3.4.3.1.4, Seasonal Migrations). As a result, gray whales are likely to be less available for harvest from December through February than during March and April when the northward migration has begun.

The inclement weather and high seas of the winter months, combined with the greater availability and accessibility of whales in the project area in the spring, make it most probable that hunting under Alternative 2 would occur in April and May. This was the case during the 1999 and 2000 hunts, when NMFS authorized hunting under the WCA. The 1999 hunt began May 10, and the 2000 hunt began April 17. The Makah tribal Council did not issue any hunting permits during the winter of 1999/2000 because of unfavorable weather conditions. The Tribe's proposal includes the option of winter hunts, and it is possible that the Tribe could hunt during that time. Given the unfavorable weather and sea conditions during winter and early spring, the nature of the Makah hunting vessel (a canoe), and the Makah's recent history, it is reasonable to expect that most hunting under Alternative 2 would likely occur in April and May.

Not every day of April and May (a 61-day period) presents favorable hunting conditions. For example, the mean number of days with rain during these two months is 19 and 20, respectively, while for fog it is 9 and 10 days, respectively (Table 3-42). Extreme low temperatures in April can drop to 33 degrees F and as low as 37 degrees F in May (Table 3-38). In the spring of 1999, the Tribe first hunted on May 10 for 10 days. In spring 2000, the Tribe first hunted on April 17 for seven non-consecutive days. Authorizing a hunt consistent with Alternative 2 would likely result in fewer than 61 days of hunting. Given the limitations of weather and sea conditions even during April and May, it is reasonable to expect that implementation of Alternative 2 would result in 7 to 30 days of hunting during April and May. Seven is the number of days the Tribe hunted in 2000, and 30 represents half the days available during the most likely months for hunting.

Given the limited number of actual hunting days available under Alternative 2, and based on whale hunting in the recent past, it is possible that the Tribe may not be able to harvest the average quota of four whales per year, at least initially. The 1999 hunt occurred over 10 days and resulted in the harvest of one whale. The 2000 hunt occurred over seven days and resulted in no harvest of whales. It is possible that interference by protesters decreased the effectiveness of the Makah hunters during 1999 and 2000. With experience, the Tribe is likely to become more proficient at locating and harvesting whales, but the realistic amount of time available for hunting under Alternative 2 may still prevent the Tribe from harvesting four gray whales in a year.

Under Alternative 2, the Tribe would cease hunting in any year if it killed a predetermined number of identified whales from the PCFA survey area, which it describes as an 'allowable bycatch level.' The Tribe proposes that this level be calculated using NMFS' potential biological removal (PBR) methodology (Section 3.4.2.1.4, Defining and Calculating PBR), applied to annually updated minimum abundance[1] estimates of returning whales in the Oregon Southern Vancouver Island (ORSVI) survey area. The Tribe's proposed method would result in an allowable bycatch level of 2.35 percent of the minimum estimated abundance of whales in the ORSVI survey area. The PBR method is described in greater detail in Section 3.4.2.1.4, Defining and Calculating PBR, and the Tribe's proposal for applying it is described further in Appendix A. In particular, the Tribe proposes to calculate the allowable bycatch level based on the minimum estimated abundance of whales identified as returning to the ORSVI survey area[2], but apply it to the larger pool of whales identified in the PCFA survey area in any given year.[3] Thus, the limit could be reached by removing whales that had never been seen in the Makah U&A and ORSVI, but had been seen elsewhere within the PCFA. The allowable by-catch level using the current minimum abundance estimate of 102 would be 2.4 whales (102 times 0.0235). This estimate would be rounded down to two whales.

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[1] These estimates may lag by up to one year due to the time required to review survey annual data.

[2] As described in Section 3.4.3.2.1, Summer Range Distribution and Habitat Use, the abundance estimate is based on whales either observed returning, or predicted to return, to the ORSVI survey area, minus an estimated mortality rate. The abundance estimate is thus smaller than the number of all whales sighted in the ORSVI survey area, which includes whales that were only seen in one year and may not have returned.

[3] As in Chapter 3, Affected Environment, Chapter 4 uses the terms "whales identified in the PCFA survey area" interchangeably with "PCFA whales." This is also the case for ORSVI whales and Makah U&A whales. This terminology applies to whales identified in a survey area, even if they were only seen in that area in one year.

The Tribe proposes to apply the allowable bycatch level only to whales that are successfully landed and not to those that are struck and lost. Some proportion of struck and lost whales would, however, likely be whales identified from the PCFA, ORSVI, or Makah U&A survey areas. With an allowable bycatch level of 2 for PCFA whales and the restriction of 3 struck and lost, a maximum of 4 whales from the PCFA could be killed. This would happen if 2 whales from the PCFA were struck and lost before 2 whales from the PCFA were landed. This maximum number is based on the current minimum abundance estimate for ORSVI. The actual maximum would depend on the estimate for any given year, which would be adjusted as new data became available.

The previous discussion addresses the maximum number of PCFA whales that might be killed each year under Alternative 2. This analysis also considers a more likely number of identified whales that might be killed per year, based on their representation in the Makah U&A during the time the Makah propose to hunt (prior to June 1). From data collected before June 1 during 1998-2005, 17.9 percent of whales seen in the northern Washington coast survey area (coastal portion of the Makah U&A) prior to June 1 were whales identified in the PCFA survey area after June 1 (PCFA whales), 17.9 percent were also whales identified in the ORSVI survey area after June 1 (ORSVI whales), and 12.5 percent were whales identified in the Makah U&A after June 1 (Makah U&A whales) (Section 3.4.3.3.2, Winter Range Distribution and Habitat Use). If a total of seven whales are killed in a year under Alternative 2, the likely number of PCFA whales that would be killed in a year would be 1.25 (seven whales killed times 17.9 percent); the likely number of ORSVI whales would be 1.25 (seven whales killed times 17.9 percent); and the likely number of Makah U&A whales would be 0.875 (seven whales killed times 12.5 percent). These numbers are subsets of one another (the Makah U&A is contained in ORSVI, which is contained in PCFA; Figure 3-4) and should not be added together.

These more likely estimates are conservative because they are based on seven whales per year being killed. With the limit of three struck and lost, the maximum of seven whales struck (all assumed dead) can only occur if one of two situations occur:

1) two whales are struck and lost before four whales are killed and landed and then a final whale is struck and lost, or
2) two whales are struck and lost before five whales are killed and landed.

All other scenarios would result in fewer whales being killed. We have not attempted to develop probabilities for each scenario, but have instead used the conservative maximum of seven.

Based on its experience during the 1999 and 2000 hunts, the Tribe also estimates that, for every whale struck, there could be approximately four whales subjected to unsuccessful harpoon attempts and 10 whales approached. The Tribe further estimates average pod size to be two whales. Relying on these estimates, the Tribe anticipates that no more than 28 gray whales would be subject to unsuccessful harpoon attempts in any calendar year (four unsuccessful attempts for each of seven struck whales), and no more than 140 whales would be subject to approaches with no harpoon attempt in any calendar year (10 whales approached for each of seven whales struck, times two in a pod). Expanding these estimates over the five-year period, NMFS further estimates that the number of whales subjected to harpoon attempts over the five-year period could be as high as 140 (28 per year times five years), and the number of whales approached could be as high as 700 (140 per year times five years). These estimates are likely conservative, given that the estimate of seven strikes is high, and that the Tribe may not be able to harvest four whales under Alternative 2.

The Tribe proposes to use a toggle-point harpoon to strike and secure whales and a .50 caliber rifle to kill whales that have been struck and secured. This EIS also examines the alternative of using explosive grenades to strike whales, kill whales, or both. Based on the Tribe's experience with the 1999 hunt, in which four shots were fired to kill the whale that was harvested, NMFS estimates that there would be four rifle shots for each struck whale.[4] This would result in a maximum of 28 rifle shots annually (four shots times seven struck whales) and 140 over a five-year period (28 shots annually times five years). Based on the experience of other aboriginal whale hunters (Section 3.4.3.5.4, Method of Killing and Time to Death), NMFS estimates that, if the Tribe used explosive projectiles to strike and kill whales, a maximum of three grenades per whale would be detonated. This would result in a maximum of 21 grenade explosions annually (three explosions times seven struck whales) and 105 over a five-year period (21 explosions per year times five years).

4.1.3 Alternative 3

Alternative 3 would allow the same numbers of whales harvested, struck, and struck and lost, as well as the same hunting area, as Alternative 2. This alternative would include no limitations

[4] At least 16 shots were fired during the unauthorized gray whale hunt in 2007 (Section 1.4.2, Summary of Recent Makah Whaling – 1998 through 2007). Because the 2007 hunt followed none of the procedures (Section 1.4.2 Summary of Recent Makah Whaling – 1998 through 2007) recommended by the Tribe, that precedent is not useful for determining what would happen in a future authorized hunt.

based on the harvest of PCFA whales or on the timing of the hunt and would not limit hunting around any rocks or islands.

Under Alternative 3, hunting would be allowed year-round. This would give the Tribe the option to hunt during the summer months when weather conditions would be more conducive than during the winter months. (The Tribe did not hunt during the summer months in 1999 and 2000, but this experience is not indicative of whether they would be likely to hunt during summer months in the future, if such a hunt were authorized. In 1999, the Tribe stopped hunting after its first successful hunt on May 17. In 2000, the Tribe had intended to continue hunting in June after its unsuccessful attempts in May, but canceled plans for hunting after the Ninth Circuit issued its decision in *Metcalf v. Daley* (2000).)

The lack of a limit on the harvest of PCFA whales would also affect the months during which the Tribe might hunt. Whales in the Tribe's U&A after June 1 are, by definition, PCFA whales, because the survey area encompasses the Tribe's U&A, and June 1 marks the beginning of the summer feeding period. Removing the limit on the number of PCFA whales that may be harvested would remove a constraint that might have otherwise caused the Tribe to avoid hunting during the summer period. Because the Tribe could hunt year round and there would be no limit on PCFA whales, under this alternative all seven whales that could be killed each year (as determined by the seven-whale strike limit) could be PCFA whales.

Implementing Alternative 3 would, on average, result in as many 40 days of hunting year round. Most hunting would likely occur from April through September each year. The Tribe's successful hunt in 1999 occurred on the tenth day of hunting. Based on the ratio of days of hunting to whales harvested, it is reasonable to expect that the harvest of twenty whales over five years would result in an average of 40 days of hunting per year. It is also reasonable to expect that hunting would be spread across the season, since butchering and processing the whale and conducting community ceremonies and celebrations in 1999 were significant undertakings (Table 3-29). Based on the year round hunting season and lack of limits on PCFA whales under Alternative 3, it is also likely that the Tribe would have a greater opportunity and, therefore, a greater likelihood of harvesting 20 whales over five years than under Alternative 2.

As under Alternative 2, the maximum allowable number of whales struck in a given year would be seven, and the maximum allowable number struck and lost would be three. The Tribe's and NMFS' estimates for the number of whales exposed to unsuccessful harpoon attempts and approaches would be the same as under Alternative 2. NMFS' estimates of the number of rifle shots and grenade explosions would also be the same as under Alternative 2. It is possible that fewer rifle shots or grenade explosions would be necessary to kill whales under Alternative 3 because of the opportunity to hunt during the summer, when better weather and sea conditions might improve hunter accuracy. Due to the uncertainty associated with such a prediction, however, the analysis makes the conservative assumption that there would be the same number of weapons discharges regardless of the hunting season.

Because Alternative 3 allows for a year-round hunting season that includes better weather conditions and does not place a limit on PCFA whales, it is more likely under Alternative 3 that the Tribe would reach the strike limit than under Alternative 2. It is also more likely that the estimated numbers of unsuccessful harpoon attempts and approaches would occur, as well as the estimated numbers of rifle shots and grenade explosions.

4.1.4 Alternative 4

Alternative 4 has the same restrictions as Alternative 2, but with the additional requirement that hunters maintain a minimum distance of 200 yards from all rocks and islands in the project area. Given the size of the area in which hunting can occur, it is reasonable to expect that the number of whales harvested, struck, struck and lost, subject to harpoon attempts, and subject to approaches would be the same as under Alternative 2, and that there would be the same number of rifle shots or grenade explosions. It is also reasonable to expect that the same number of PCFA whales could be killed as under Alternative 2. As with Alternative 2, the limitations on the hunting season and the harvest of identified whales may make it difficult to harvest the full number of whales allowed.

4.1.5 Alternative 5

Under Alternative 5, the Tribe could hunt at any time during the year within the coastal portion of their U&A, but the limits on the numbers of whales would be lower. Under Alternative 5, the Tribe could harvest two whales, strike three whales, and strike and lose one whale. There would be no limit on the harvest of PCFA whales. Hunting would not be prohibited around any rocks or islands. Given the opportunity to hunt year round and the lower harvest limit, it is reasonable to expect the Tribe would be able to harvest the full number of whales allowed under this alternative. Under Alternative 3, all three whales potentially killed could be PCFA whales. Because the harvest of one whale in 1999 occurred after 10 days of hunting, it is reasonable to expect there would be 20 days of hunting under Alternative 5. Hunting might occur year round but is more likely to occur from April through September.

Applying the Tribe's estimates of unsuccessful harpoon attempts and approaches to the lower number of whales allowed under this alternative, there would potentially be 12 whales subjected to unsuccessful harpoon attempts (four unsuccessful attempts for each of three whales struck) and 60 whales approached (10 whales approached for each of three whales struck, times two whales in a pod) each year. Over the five-year period, there would be 60 whales subjected to unsuccessful harpoon attempts (12 harpoon attempts per year times five years) and 300 whales approached (60 whales approached per year times five years). Also using the calculations described for Alternative 2, there would potentially be 12 rifle shots annually (60 over the five-year period) or nine grenade explosions annually (45 over the five-year period). Given the lower number of whales, and the opportunity to distribute hunting throughout the year, NMFS assumes the Tribe would likely harvest the maximum number of whales allowed under Alternative 5.

4.1.6 Alternative 6

Conditions under Alternative 6 would be the same as under Alternative 3, except that hunting would be allowed within the Strait of Juan de Fuca. Adding this area to the hunt would probably not change the seasons during which hunting would occur or the numbers of gray whales affected relative to those expected under Alternative 3.

4.2 Water Quality

4.2.1 Introduction

This section addresses the potential for the alternatives to affect water quality in the project area, including marine water and groundwater. No hunt-related activities would take place above the high-tide line, so there is no potential to affect surface water quality, including streams and tributaries in Water Resource Inventory Areas 19 and 20. Two issues pertain to the potential effects on water quality of whale hunt-related activities. First is the potential for spills of vessel fuel or other contaminants due to collisions or other incidents involving marine vessels associated with the hunt, including observers and protesters. Second is the potential for groundwater contamination due to leaks of fluids from whale carcasses or tissues that may be disposed of in a landfill. The method for disposing of any unused portions of harvested whales could include towing out to sea or disposal in a landfill. This analysis addresses the effects of disposal in the Neah Bay landfill or a transfer station at the same location. Effects of disposal at sea are addressed in Section 4.3, Marine Habitat and Species.

None of the alternatives has the potential to affect drinking water quality, because no hunt-related activities would have the potential to affect current or future drinking water sources in the project area. The potential effects on water quality for the marine aquatic ecosystem (other than effects that might be related to spills, which are discussed in Section 4.2.2.1, below) would be negligible because the amount and longevity of any toxins would be minimal. Similarly, there would be no potential for any long-term effects on the management of shellfish beds in the project area because any contaminants found in whales would have no potential to affect shellfish management. The following sections discuss these points in greater detail.

4.2.1.1 Drinking Water Sources

As described in Section 3.2.3.1, Drinking Water Sources, all drinking water in the project area comes from surface water sources. Limited availability of suitable drinking water led to a moratorium on new residential and commercial building on the reservation in 2000. Under the action alternatives, activities related to hunting and butchering whales would occur in marine or intertidal areas and therefore would not expose any current drinking water sources to whale-derived contaminants. Of the three potential future water sources identified in Section 3.2.3.1, Drinking Water Sources, two are surface water and would likewise be unaffected. The third option is a desalinization plant at the outlet of the Wa'atch River. The mechanism used to treat the water at such a plant (reverse osmosis) would produce water that meets federal standards for drinking water even if contaminants are present at the water collection site (for example, reverse osmosis is used to polish secondary effluent from wastewater treatment plants, rendering it suitable for use as drinking water). There is no potential, therefore, for whale-derived contaminants to affect any of the potential future drinking water sources that have been identified in the project area. Disposal of a whale carcass or carcasses in the Neah Bay landfill (or temporary storage at a transfer station, following closure of the landfill) would have the potential to affect only groundwater, so no drinking water sources could be affected. The potential effects on groundwater are discussed in Section 4.2.2.2, below.

4.2.1.2 Marine Waters

In marine and intertidal waters, whale hunting and butchering under the action alternatives would produce two broad classes of potential contaminants: organic material (e.g., blood, lymph, digestive tract contents) and bioaccumulated contaminants (e.g., PCBs, DDTs). During a successful whale hunt, the initial strike and kill would be expected to release substantial amounts of organic matter, which would continue to leak out of the carcass as it was hauled to the beach. The likely effects of this material would be attraction of predators to the blood scent, avoidance of blood by common prey fish species, and secondary effects of decreased dissolved oxygen associated with the breakdown of the organic material by marine bacteria. These effects would extend over a relatively short period (likely several hours) and would have a very low probability of affecting the marine environment in any detectable manner for more than a day or two.

Any bioaccumulated contaminants in a whale carcass would be associated primarily with whale blubber, most of which would be removed and used for subsistence or ceremonial purposes. As described in Section 1.4.2 (Summary of Recent Makah Whaling – 1998 through 2007), following the successful hunt in 1999, Makah tribal members removed almost all edible portions of the meat and blubber from the whale within approximately 12 hours of towing the whale to shore. Under the action alternatives, if hunting and butchering were to proceed as they did in 1999, there would be little opportunity for contaminant release into the environment through decomposition while a whale is on the beach because the portions with the highest concentrations of contaminants (primarily blubber) would be removed in approximately 12 hours. If the unused portions of the carcass were towed out to sea for post-harvest disposal, some bioaccumulated contaminants might be released into the marine ecosystem. The amount of toxins released from a flensed carcass, however, would be substantially less than the amount from a whale that died and decomposed entirely at sea and, therefore, the expected impact to the marine environment would be negligible. Given the size of the ocean area in which carcasses would be disposed, the removal of most of the blubber from carcasses prior to disposal, and the likely death and decomposition of some whales in the area naturally, the expected impact to the marine environment from carcass disposal would be negligible in any given year or over a period of years.

4.2.1.3 Shellfish Beds

As noted in Section 3.2.3.2 (Shellfish), shellfish beds can be closed to harvest due to the presence of human fecal coliforms or toxic algal blooms. Fecal coliforms are not harmful to shellfish, but may be used to indicate the presence of sewage-borne organisms (pathogens) that cause disease in humans. The release of fecal coliforms into intertidal waters, therefore, would have the potential to affect aquaculture or subsistence harvest of shellfish only if the Washington Department of Health or Makah Fisheries chose to close a beach to harvest as a precautionary measure. Under the action alternatives, butchering a whale on the beach might release fecal coliforms into the intertidal area, where filter-feeding shellfish could accumulate them. Fecal coliforms from a whale, however, do not indicate an elevated risk of the presence of human pathogens. In addition, fecal coliforms are freshwater organisms that typically start to die off within 12 to 48 hours of exposure to marine water.

Regarding toxic algal blooms, research in Puget Sound has not established a statistically significant link between natural or human activities and toxic algal blooms. There is no evidence to suggest that the death of a whale (an ongoing natural process) would affect the probability of a toxic algal bloom occurring, hence requiring a shellfish harvest closure. Based on the above, it is improbable that whale hunt-related activities under the action alternatives would lead to long-term closures of shellfish beds. If, through independent monitoring, the Washington Department of Health or Makah Fisheries found elevated levels of fecal coliforms and closed a beach (which would represent a cautious response to the presence of fecal coliforms in a whale carcass on the beach), the closure could last a few days.

4.2.2 Evaluation Criteria

Two criteria were used to determine the potential for effects on water quality under the alternatives. The first is the likelihood of an increase in the risk associated with fuel spills or the introduction of other toxic substances into the environment. The second is the likelihood of an increase in the risk associated with leakage from whales disposed of in the Neah Bay landfill or transfer facility.

4.2.2.1 Spills

Spills could result from collisions between vessels, equipment failure, or accidental release (e.g., while fueling, or if a vessel capsized). No spills were reported from the 1999 and 2000 hunts, despite a collision between a protest vessel and a law enforcement vessel. If any spills occurred, effects would be minor and short-lived, even if they occurred in a semi-contained area such as Neah Bay. The volume of fuel or other contaminants carried by any hunt-related vessels would be miniscule compared to the volume of water in any potential receiving waters (e.g., Neah Bay, the Strait of Juan de Fuca, and the Pacific Ocean). A spill of fuel or similar fluids would not mix with water, but would form a thin layer on the surface, continually spreading while it evaporated, broke apart, was hydrolyzed by ultraviolet light, and was decomposed by bacteria. This would probably occur over hours or days. The nearshore portion of the Makah U&A corresponds largely with the area to be avoided for the OCNMS, which was designated with the intention of reducing the potential for catastrophic oil spills from large ships (greater than 1,600 gross tons) carrying large amounts of bunker fuel. Any vessels involved in whale hunts, protest activities, or law enforcement would be substantially smaller than that, so any spills in the Makah U&A would not violate the intention of the area to be avoided.

The risk of spills would depend primarily on the amount of hunt-related vessel traffic in the project area (including Makah vessels and associated protest, media, and law enforcement vessels). Vessels and aircraft associated with each hunt would likely be similar to those associated with the previous hunts, described in Section 3.11.3.2.1, Atmospheric Noise. It is possible that the amount of vessel traffic associated with each hunting expedition (including observation, protests, law enforcement, and media coverage) would vary under the action alternatives. For example, alternatives that allow year-round hunting could attract more observers, protestors or media coverage because of better weather conditions. Alternatives that allow more hunts might attract less public interest over time and therefore less media coverage. Because of the difficulty of predicting such variations, and how they might affect the precise amount of vessel traffic, this analysis assumes that each hunting expedition would be accompanied by the same amount of vessel traffic.

The risk of spills might also depend on the hunting season. Hunts conducted during the winter months might face a higher risk of encountering unanticipated storms that could cause vessels to capsize, as compared with hunts conducted during the summer. Thus the risk of spills is likely to depend on the number of days of hunting and the season when hunting occurs. Under any of the action alternatives, the risk from oil spills could be addressed by modifying or supplementing existing spill response plans (Ecology 2003a)(Section 3.2.3.3, Spill Prevention).

4.2.2.2 Groundwater Contamination

As noted above, the method of disposing of any unused portions of harvested whales would either be disposal at sea or in the Neah Bay landfill. The method would likely depend on the location where the whale was landed and butchered. Under the action alternatives, if any unused portions of whale carcasses were placed in the Neah Bay landfill or transfer facility, the potential would exist for contaminants from the carcass to leak through the liner material and mix with groundwater. The risk of groundwater contamination would depend on (1) the concentration of water-soluble contaminants in the unused portions of the carcass, (2) the amount of tissue delivered to the facility, and (3) the occurrence of flaws in the landfill liner. Groundwater contamination is typically detected through monitoring near landfills, but this has not occurred in Neah Bay because that landfill receives approximately 3 tons of solid waste per day (Parametrix 2007), and EPA does not require groundwater monitoring for small landfills that receive less than 20 tons of solid waste per day (EPA 2007). In addition, groundwater does not serve as a drinking water source in the project area. The greatest concentrations of contaminants occur in blubber, most of which would be removed and used for subsistence or ceremonial purposes. Contaminants in any residual blubber on a carcass would likely be hydrophobic substances such as PCBs and DDT. If any such substances leaked from a landfill, they would adhere to soils and would have a very low probability of reaching groundwater in quantities likely to be toxic.

It is not possible to predict in advance the proportion of harvested whale carcasses that would be disposed of in the landfill, the amount of material on any of those carcasses, or the concentration of contaminants in any of those carcasses. Therefore, the most reliable indicator of the potential risk of groundwater contamination is the number of whales that would be harvested under a particular alternative. This number would depend primarily on harvest limits. In addition, restrictions on hunting seasons and on the harvest of identified whales might affect the Tribe's ability to harvest the full limit allowed.

4.2.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to pose risks to water quality in the project area. For each alternative, the discussion addresses the potential number of occasions on which hunt-related activity may pose a risk of spills, and the potential amount of waste material from harvested whales that may pose a risk of groundwater contamination.

The lowest risk of adverse effects on water quality would occur under the No-action Alternative, because no whale hunts would be permitted. The risk under the action alternatives would increase, with the amount of increase depending on the number of days of hunting, the hunting season, and the number of whales harvested. Table 4-1 identifies the number of likely days of hunting and the number of whales likely to be harvested under each alternative, and Section 4.1, Introduction, describes the rationale for those numbers.

Compared to the No-action Alternative, the risk of spills would increase under Alternatives 2 and 4 due to increases in vessel traffic over 7 to 30 days and due to the fact that hunting would be limited to the winter and spring periods, when vessels might encounter unanticipated storms and capsize. The risk would increase further under Alternatives 3 and 6 due to an increase in the number of days of hunting (from 7-30 days to 40 days). On the other hand, because Alternatives 3 and 6 allow hunting year-round, the risk of vessels capsizing in unanticipated storms would be reduced compared to Alternatives 2 and 4.

Under Alternative 5, year-round hunting would be allowed. Thus, while Alternative 5 would result in about the same number of hunting days as Alternatives 2 and 4 (20 versus 7 to 30), it would carry a lower risk of vessels capsizing and thus a lower risk of spills. Because Alternative

5 would include fewer hunting expeditions than Alternatives 3 and 6, and all would allow year-round hunting, Alternative 5 would carry a lower risk of spills than Alternatives 3 and 6.

As described above, the most reliable indicator of the potential risk of groundwater contamination is the number of whales that would be harvested under a particular alternative. The No-action Alternative carries the least risk of groundwater contamination because no whales would be delivered to the landfill or transfer station beyond those that might be delivered under current conditions. Under Alternative 5, the number of whale carcasses could increase, relative to the No-action Alternative, by as many as two. Under Alternatives 2 and 4, the increase would be as many as four whales annually, on average, with a maximum of five whales in any one year, but limitations on the hunt might make it difficult for the Tribe to harvest the full number. Under Alternatives 3 and 6, the harvest limits would be the same as under Alternatives 2 and 4, but there is a greater likelihood the Tribe could harvest the full number because of the lack of restrictions on hunting seasons and on the harvest of identified whales.

4.2.3.1 Alternative 1

Under the No-action Alternative, no Makah whale hunt would be authorized and no whale hunting or associated activities (such as vessel traffic, protests, whale butchering and carcass disposal) would be expected to occur in the project area. The amount of marine vessel traffic in the project area would not differ from current levels, and the risk of spills would not change from current levels. With the possible exception of waste material from drift whales (which could be towed out to sea or disposed of on land), no whale tissue or carcasses would be delivered to the Neah Bay landfill or transfer station. If any leakage occurred at the Neah Bay landfill site, the effluent would not be different from current conditions, and the risk of groundwater contamination would remain at current levels.

4.2.3.2 Alternative 2

Under Alternative 2, vessel traffic associated with a hunt would be expected to occur on a total of 7 to 30 days, primarily during April and May. Compared to the No-action Alternative (under which there would be no hunt-related vessel traffic), this would result in an increased risk of fuels or other contaminants being released into the marine environment. As described above, because the vessels associated with hunting would be small, any spills would be rapidly diluted to undetectable concentrations in the Pacific Ocean or local bays. Non-water-soluble contaminants such as petroleum-based fuels would disperse and break down in hours or days. Also, risks due to spills could be addressed by modifying or supplementing existing spill response plans (Ecology 2003a)(Section 3.2.3.3, Spill Prevention).

Under Alternative 2, the limit on the number of harvested whales would be an average of four whales per year over five years, with no more than five in any one year. It is not possible to predict the proportion of carcasses from those harvested whales that may be disposed of in the landfill or transfer station, but the maximum number would correspond to the harvest limits (an average of four per year and no more than five in any single year). If any leakage occurred at the landfill, the effluent might contain contaminants, which could enter groundwater. For the reasons described above, there would be no expected effect on drinking water sources.

The hunting season under Alternative 2 would be restricted to the period of December 1 to May 31, which would likely limit the number of days that tribal members could hunt, thus reducing their chances of harvesting the average of four whales per year. Limits on the number of identified whales that may be harvested could also reduce the chances of harvesting the average of four whales per year.

4.2.3.3 Alternative 3

Alternative 3 would include the same limits on the number of whales harvested as Alternative 2, but would impose no restrictions on the hunting season or on harvest of identified whales. Under Alternative 3, vessel traffic associated with a hunt would be expected to occur on a total of 40 days. Compared to the No-action Alternative (under which there would be no hunt-related vessel traffic), this would result in an increased risk of fuels or other contaminants being released into the marine environment.

Compared to Alternative 2, there would also be a greater risk of fuels or other contaminants being released into the marine environment because there would be more days of hunt-related vessel traffic (40 days compared to 7-30 days). The increased risk under Alternative 3 versus Alternative 2 would be reduced to some extent by the fact that hunting under Alternative 3 could occur year round (including during seasons with calmer seas), reducing the potential for vessels capsizing in unexpected storms. As described above, because the vessels associated with hunting would be small, any spills would be rapidly diluted to undetectable concentrations in the Pacific Ocean or local bays. Non-water-soluble contaminants such as petroleum-based fuels would disperse and break down in hours or days. Also, risks due to spills could be addressed by modifying or supplementing existing spill response plans (Ecology 2003a)(Section 3.2.3.3, Spill Prevention).

The maximum number of whales that could be harvested under Alternative 3 would be the same as under Alternative 2 (an average of four per year, with no more than five in any one year), but the increased hunting opportunities and the lack of restrictions on identified whales under Alternative 3 would make it more likely that the Tribe could harvest the full number. Therefore, Alternative 3 would have a greater increase in risk of groundwater contamination than would Alternative 2. For the reasons described above, there would be no expected effect on drinking water sources.

4.2.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2 and would impose the same restrictions on the hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not affect the risk of fuel or contaminant spills, nor the number of whales potentially harvested by the Tribe. Therefore, the increased risk of fuels or other contaminants being released into the marine environment, and the increased risk of groundwater contamination from material delivered to landfills, would be the same as under Alternative 2, compared to the No-action Alternative. Also, risks due to spills could be addressed by modifying or supplementing existing spill response plans (Ecology 2003a)(Section 3.2.3.3, Spill Prevention).

4.2.3.5 Alternative 5

Alternative 5 would limit the number of whales that may be harvested to two in any one year and 10 over the five-year period. Year-round hunting would be allowed, making it likely that the full number of whales would be harvested. The expected number of hunting days would be 20 per year. Compared to the No-action Alternative, this alternative would result in increased hunt-related vessel traffic over 20 days, which would lead to an increased risk that fuels or other contaminants might be released into the marine environment. Also, compared to the No-action Alternative, as many as two whales might be discarded in the landfill in any one year, increasing the potential for contaminants to enter the groundwater. For the reasons described above, there would be no expected effect on drinking water sources.

Compared to Alternatives 2 and 4, Alternative 5 might result in about the same number of days of hunting (20 versus 7 to 30) and therefore a comparable risk of fuels or other contaminants being released into the marine environment. Compared to Alternatives 3 and 6, Alternative 5 would be expected to have a lower risk of spills because of fewer days of hunting (20 days versus 40).

Also, risks due to spills could be addressed by modifying or supplementing existing spill response plans (Ecology 2003a)(Section 3.2.3.3, Spill Prevention). Compared to the other action alternatives, Alternative 5 would have a lower risk of groundwater contamination because of the lower limit on the number of whales that could be harvested.

4.2.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunt attempts and the same number of whales harvested as Alternative 3. Thus the increased risk of fuels or other contaminants being released into the marine environment, and the increased risk of groundwater contamination from material delivered to landfills would be about the same as under Alternative 3, compared to the No-action Alternative. Compared to the other action alternatives, Alternative 6 would also be expected to have the same relative effects on water quality as Alternative 3. The only difference between Alternative 6 and Alternative 3 is that Alternative 6 would allow hunting in the strait, so the potential for spills would be expanded from the coastal portion of the Makah U&A to the Strait. As described above, because the vessels associated with hunting would be small, any spills would be rapidly diluted to undetectable concentrations in the Strait. Non-water-soluble contaminants such as petroleum-based fuels would disperse and break down in hours or days. Also, risks due to spills could be addressed by modifying or supplementing existing spill response plans (Ecology 2003a)(Section 3.2.3.3, Spill Prevention).

4.3 Marine Habitat and Species

4.3.1 Introduction

This section evaluates the potential for the six alternatives to affect marine habitat and associated biological resources within the project area. It includes a discussion of the likely ecological consequences of two possible types of effects that were identified through the internal and public scoping processes (Section 1.5.2.2, Marine Habitats and Species): (1) potential direct effects from hunt-related activities such as disturbance associated with marine vessel traffic or disposition of whale carcasses and (2) potential indirect effects resulting from the removal or harassment of gray whales from the local ecosystem, such as reduced benthic disturbance by feeding whales and decreased consumption of pelagic and epibenthic prey. Consistent with the description of marine habitat and associated species in Section 3.3, Marine Habitat and Species, this analysis separately examines the potential effects on pelagic and benthic habitats.

4.3.2 Evaluation Criteria

None of the action alternatives has the potential to appreciably affect the physical features and dynamic processes of the pelagic or benthic environments (described in Sections 3.3.3.1.1, Pelagic Environment, Physical Features and Processes, and 3.3.3.2.1, Benthic Environment, Physical Features and Processes, respectively). The ocean currents, seasonal variability, upwelling, downwelling, eddies, fronts, El Niño Southern Oscillation events, and Pacific Decadal Oscillation that influence the pelagic environment are large-scale, physical oceanographic and climatic processes that cannot reasonably be expected to be affected by the action alternatives, which involve comparatively small-scale, short-term, localized activities. Similarly, the substrata, features (e.g., submarine canyons), and physical disturbances that make up the benthic environment also are large-scale and cannot reasonably be expected to be affected by the small-scale, short-term and localized activities associated with the action alternatives.

Consequently, the evaluation of the action alternatives below focuses on the potential direct and indirect effects on the biological resources associated with the pelagic and benthic environments. For both the pelagic and benthic environments, two criteria were used to determine the potential for effects. The first is the amount of physical disturbance associated with conducting a whale hunt (such as vessel traffic or towing a whale), which could have direct effects on the environment. The second is the change in pelagic or benthic communities in the project area, which could result if gray whales are removed from the project area. The following sections discuss the potential effects in greater detail and how the effects for each alternative may be assessed and differentiated.

4.3.2.1 Pelagic Environment Evaluation Criteria

4.3.2.1.1 <u>Disturbance of Pelagic Species</u>

Hunt-related activities, such as vessel traffic or hauling of whale carcasses, could disturb fish or other pelagic species. This evaluation criterion relates to the potential risk that the action alternatives may affect the distribution and abundance of fish or other pelagic species in the project area. The amount of disturbance and any resulting change in fish distribution or abundance would depend primarily on the amount, distribution, and timing of hunt-related vessel traffic in the project area. The amount of anticipated vessel traffic would depend on the number of hunts initiated and how many whales could be struck or harvested under a given action alternative. The distribution of vessel traffic would depend on the hunt area (that is, whether the Strait of Juan de Fuca is as part of the hunt area) and the specific location of pursued whales at the time of a hunt. Vessel traffic timing would depend on the hunting season under a given alternative.

4.3.2.1.2 <u>Changes in the Pelagic Community</u>

This evaluation criterion relates to the potential ecological consequences of a whale hunt on the pelagic environment. If the consumption of pelagic prey by gray whales represents a significant factor in determining zooplankton species abundance or plays a significant role in structuring planktonic communities, it is possible that the abundance, species composition, and spatial distribution of pelagic organisms could be altered if whales were harassed in or removed from the project area. The amount of ecological change induced by a whale hunt would depend on the relative change in whale presence and prey consumption, as well as the importance of whale prey consumption relative to oceanographic/climatic processes in determining the dynamics of zooplankton species assemblages in the project area.

4.3.2.2 Benthic Environment Evaluation Criteria

4.3.2.2.1 <u>Disturbance of Benthic Habitat</u>

Potential direct impacts to the benthic habitat from hunting gray whales might result from disturbances associated with increased vessel traffic and disposition of carcasses. Such impacts could include (1) disturbance or damage to eelgrass, surfgrass, kelp beds, or kelp rafts; (2) an increase in the number or generation of kelp rafts; (3) disturbance to nearshore rocky and soft bottom communities; and (4) disturbance or damage to shellfish resources. Each of these potential impacts is considered under the evaluation criterion for assessing disturbances to the benthic habitat and is described in more detail in the following paragraphs.

Hunt-related activities, such as nearshore vessel traffic and hauling whale carcasses, could result in the disturbance of marine plant or kelp beds at or near landing beaches. This analysis considers the frequency and severity of such hunt-related disturbances relative to the natural levels of physical disturbance in the project area. Additionally, the capacity of these marine plant and macroalgal species for growth and recolonization in response to disturbance is an important consideration. The amount of hunt-related disturbance would depend primarily on the amount of hunt-related vessel traffic in the project area. The amount of vessel traffic that may be expected would depend on the number of hunts initiated and how many whales could be struck or harvested under a given action alternative.

Floating rafts of kelp and associated biota occur within the project area. Kelp rafts are generated by storms and other disturbance events that dislodge kelp holdfasts from their attachment to the substratum. Although kelp rafts are free-floating and associated with the pelagic environment, they are considered in this analysis as part of the benthic habitat as they are the product of benthos disturbance. They are ecologically important to benthic communities as potential vectors of dispersal for benthic species and as possible sources of organic material upon sinking. Hunt-related activities such as vessel traffic could potentially generate kelp rafts by disturbing stands of kelp. Additionally, kelp rafts are susceptible to damage or disturbance if struck by the propellers of vessels associated with the hunt. Any hunt-related generation or disturbance of kelp rafts would occur in the context of background physical processes affecting the generation and disturbance of kelp rafts in the project area. The amount of hunt-related disturbance would depend primarily on the amount of hunt-related vessel traffic in the project area. The amount of vessel traffic that may be expected would depend upon the number of hunts initiated and the number of whales that could be struck or harvested under a given action alternative.

The hauling and landing of whale carcasses on rocky or soft-bottomed nearshore habitats could result in the disturbance of associated species and communities. This analysis considers the frequency and severity of such a hunt-related disturbance relative to background levels of natural disturbance (e.g., storms, wave action, and predation). The amount of hunt-related disturbance would depend primarily on how many whales could be harvested under a given action alternative.

The landing of whale carcasses on beaches with shellfish resources could result in disturbance of these shellfish communities (the potential for hunt-related activities to result in the closure of beaches to shellfish harvest is evaluated in Section 4.2, Water Quality, above). This analysis considers the frequency and severity of such a hunt-related disturbance relative to background levels of natural disturbance (e.g., storms, wave action, and predation). The amount of hunt-related disturbance to shellfish communities would depend primarily on how many whales could be harvested under a given action alternative.

4.3.2.2.2 Changes in Disturbance-dependent Benthic Communities

Potential indirect impacts on the benthic habitat from hunting gray whales may occur if benthic-feeding gray whales were harassed in or removed from the ecosystem. Such impacts include change in the relative level of benthic disturbance due to a decrease in the number of benthic-feeding gray whales and change in the abundance or distribution of benthic prey species due to a decrease in the quantity of benthic food consumed by gray whales.

If feeding-associated disturbance by benthic-feeding gray whales represented a significant factor in structuring benthic communities, benthic communities could be altered if whales were harassed in or removed from the project area. Background physical processes may include disturbance by storms, wave action, and movement and accumulation of sediments (e.g., turbidity currents). Background biological processes may include seasonality and variability of surface water productivity and delivery of organic material to the benthic communities. The amount of ecological change induced by a whale hunt would relate to changes in whale presence, as well as the importance of whale prey consumption relative to other physical and biological processes in determining the dynamics of benthic species assemblages in the project area.

This analysis also considers the potential ecological consequences of a whale hunt on the benthic environment. If the consumption of benthic prey by gray whales represents a significant factor in determining species abundance and distribution, the abundance, species composition, and spatial distribution of benthic food items might be altered if whales were removed from or harassed in the project area. The amount of ecological change induced by a whale hunt would relate to changes in whale presence and prey consumption, as well as the importance of whale prey consumption relative to other physical and biological processes in determining the dynamics of benthic species assemblages in the project area.

4.3.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect pelagic and benthic habitats and associated biological resources in the project area. For each alternative, risks to both pelagic and benthic environments are discussed. The analysis evaluates potential effects due to direct disturbance and indirect ecological effects of a whale hunt under a given alternative.

The marine environment of the project area, as noted in Section 3.3.1, Introduction, is highly energetic, productive, and variable due to the dynamic physical oceanographic processes and the high levels of physical disturbance characteristic of the Washington coast. The abundance, recruitment, distribution, and variation in marine species and communities in the project area strongly reflect the underlying physical environment. When evaluated in the context of this energetic and dynamic environment, evaluation of the alternatives indicates that none has the potential to appreciably affect pelagic or benthic habitats or the associated organisms and communities. The following sections discuss these conclusions in more detail.

4.3.3.1 Alternative 1

Under Alternative 1, the No-action Alternative, no whale hunt would be permitted, no associated activities (e.g., increased vessel traffic) would be expected to occur, and no whales would be harassed in or removed from the project area. The dynamic processes described in Section 3.3.3, Existing Conditions, would be expected to continue in both the pelagic and benthic environments. No direct disturbance resulting in the altered presence or abundance of fish or other pelagic species would be expected, nor would pelagic species or the community experience any indirect ecological consequences because there would be no hunting activities. Similarly, no direct disturbance would affect marine plant or kelp beds, kelp rafts, nearshore communities, or nearshore shellfish resources, nor would benthic species and communities experience indirect ecological effects.

4.3.3.2 Alternative 2

Whale hunts would be permitted under Alternative 2, resulting in an expected increase in hunt-associated vessel traffic over the No-action Alternative, as well as the harassment or removal of whales from the project area. The number of days of hunting anticipated under Alternative 2 would be 7 to 30. An average of four whales may be harvested per year, with no more than five harvested in a single year. No more than seven whales may be struck per year, and no more than 35 may be struck over a five-year period. No more than three whales may be struck and lost in any year. Limits on the hunting season (December 1 through November 31) and limits on the numbers of identified whales that may be harvested, may make it difficult for tribal members to harvest the full number of whales allowed.

4.3.3.2.1 Pelagic Environment

Compared to the No-action Alternative, Alternative 2 would likely result in an increased level of direct disturbance due to hunt-associated vessel traffic and the hauling of whale carcasses that have been harvested. These activities might disturb fish or other pelagic species in the project area. Any such disturbance would, however, likely be minor (vessels are small and the area is large and highly energetic), local (limited to waters near the activity), and of short duration (minutes to hours). Because any disturbance would be minor, localized, and short-term, it would be unlikely to result in an appreciable change in the presence, distribution, or abundance of fish and other pelagic species in the project area, compared to current conditions under the No-action Alternative.

This alternative would involve pursuit and hunting of gray whales, and it would likely result in harassment or removal of whales from the project area. As noted above, the potential ecological effect of removing whales from the ecosystem on pelagic species and assemblages would depend on (1) the relative change in whale presence and prey consumption and (2) the relative importance of whale prey consumption in determining the dynamics of zooplankton species assemblages in the project area.

The consumption of pelagic prey by gray whales is not likely a significant factor in structuring pelagic communities relative to the highly variable and energetic oceanographic and climatic processes characteristic of the project area. As discussed in Section 3.3.3.1, Pelagic Environment, the physical features and ephemeral, seasonal, interannual, and interdecadal physical oceanographic processes largely control the abundance, distribution, and species composition of pelagic prey in the region. However, even assuming that gray whales do play a substantial role in structuring pelagic communities, the potential relative change in the number of whales under this and the other action alternatives would probably not result in any appreciable ecological effects. The number of whales allowed to be removed represents a small proportion of the ENP gray whale population or the number of whales observed migrating through the project area (less than 1 percent of some 20,000 whales, and less than 5 percent of the 464 whales observed in the Makah U&A [Section 3.4.3.3, Distribution and Habitat Use]). Furthermore, the number of whales potentially removed is substantially smaller than the observed levels of interannual variability in whale abundance within the project area. Consequently, any relative change in the quantity of pelagic prey consumed due to removal of whales under Alternative 2 would be negligible and lower than the expected levels of natural variability.

4.3.3.2.2 Benthic Environment

Compared to the No-action Alternative, an increased level of direct disturbance would probably occur under Alternative 2 due to hunt-associated vessel traffic and the hauling of whale carcasses. The expected amount of disturbance to eelgrass, surfgrass, kelp beds, and shellfish communities would depend on the specific route of hunt-associated vessels, as well as the location of these communities relative to the landing beach for any whale carcasses. The marine plant, macroalgal, and shellfish communities in the project area thrive in a highly energetic and disturbance-prone nearshore environment such that any hunt-associated disturbance effects would likely be insignificant relative to the high levels of natural background disturbance. Furthermore, the high capacity of these species for growth and recolonization suggests that hunt-associated disturbance effects, if any, would be short-lived. Similarly, any direct disturbance to kelp rafts would likely be insignificant relative to the background physical processes affecting the generation and distribution of kelp rafts in the project area.

As discussed above, in evaluating the potential consequences of whale removal for the pelagic environment, the potential change in the number of whales under this and the other action alternatives would be small relative to the overall whale population and natural levels of variability in whale presence. Consequently, the removal of whales would probably not appreciably change background levels of benthic disturbance or the quantity of benthic prey consumed. Furthermore, whale foraging does not appear to play a significant role in structuring benthic and epibenthic communities in the project area. Rather, these benthic communities are most strongly affected by the presence of benthic features (e.g., submarine canyons), physical disturbance processes (such as storms, wave action, and the movement and accumulation of sediments), and ephemeral, seasonal, interannual, and interdecadal physical and biological processes affecting the delivery of organic material from productive surface waters.

Any whales struck and killed but lost would affect the benthic environment by providing 'whale fall' microhabitats. This would also be the case for carcasses of any whales harvested and disposed of at sea. As the whale decays on the ocean floor, it provides an ephemeral habitat associated with a unique and diverse invertebrate community. Whale falls occur naturally when individuals die and sink to the sea floor. Under Alternative 2, up to three whales may be struck and lost per year (presumably resulting in whale falls), and up to 15 whales may be struck and lost over a five-year period. No estimates are available for the annual level of natural mortality that may occur within the project area. Such an estimate would be useful for establishing a background level of whale falls expected to occur naturally, enabling a comparison with the number of additional whale falls that might be generated under Alternative 2. Compared to the annual level of natural mortality for the ENP gray whale stock (with a population of some 20,000), the addition of three whale falls annually would be minor.

4.3.3.3 Alternative 3

Alternative 3 would include the same limits on total numbers of whales struck, harvested, and struck and lost as Alternative 2, but there would be no limits on identified whales and no seasonal restrictions on hunting. tribal members would likely hunt year round, including during summer and early autumn, when weather conditions would be less likely to interfere with hunting opportunities and compromise hunter safety. Compared to Alternative 2, more opportunities for hunting would probably result in a greater number of hunting expeditions (40 days under Alternative 3 compared to 7-30 days under Alternative 2), with an attendant increase in vessel traffic. There is also a greater likelihood under Alternative 3 than under Alternative 2 that the full number of whales could be harvested, because of the year-round opportunity to hunt and the lack of limits on identified whales. The increased number of days of hunting and greater likelihood that the full number of whales would be towed to shore would be expected to result in slightly increased effects over those anticipated under Alternative 2, compared to the No-action Alternative.

4.3.3.3.1 <u>Pelagic Environment</u>

The risk of direct disturbance of fish and other pelagic species under this alternative, although potentially higher than under Alternative 2, would still be minor, localized, and of short duration. Similarly, for the reasons described under Alternative 2, even though there is a greater chance that the full number of whales may be removed, any removal of whales under Alternative 3 is not likely to result in indirect ecological effects on pelagic communities. Thus, compared to the No-action Alternative, Alternative 3 is not likely to result in an appreciable change in the presence, distribution, or abundance of fish and other pelagic species in the project area.

4.3.3.3.2 <u>Benthic Environment</u>

The risk of direct disturbance of benthic marine plant, macroalgal, shellfish, and kelp raft communities under this alternative, although potentially greater than under Alternative 2, would be negligible relative to the high levels of background disturbance and the strong capacity of these species for growth and recolonization. Similarly, for the reasons described under Alternative 2, any removal of whales under Alternative 3 is not likely to result in indirect ecological effects on pelagic communities. Thus, Alternative 3 would probably not result in an appreciable change in benthic communities compared to current conditions under the No-action Alternative.

4.3.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2 and would impose the same restrictions on the hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not affect the likely number of hunting expeditions, patterns of vessel traffic, or the number of whales potentially struck, harvested, or struck and lost. Therefore effects on marine habitat and species under Alternative 4 would likely be the same as those described under Alternative 2.

4.3.3.4.1 <u>Pelagic Environment</u>

Similar to Alternative 2, this alternative would likely result in minor, local and short-term effects on pelagic communities through direct disturbance. Similarly, for the reasons described under

Alternative 2, any removal of whales under Alternative 4 is not likely to result in indirect ecological effects on pelagic communities. Thus Alternative 4 would probably not result in appreciable changes in the presence, distribution, or abundance of fish and other pelagic species in the project area compared to current conditions under the No-action Alternative.

4.3.3.4.2 <u>Benthic Environment</u>

Similar to Alternative 2, the risk of direct disturbance of benthic marine plant, macroalgal, shellfish, and kelp raft communities under this alternative would be negligible relative to the high levels of background disturbance and the strong capacity of these species for growth and recolonization. Similarly, for the reasons described under Alternative 2, any removal of whales under Alternative 4 is not likely to result in indirect ecological effects on pelagic communities. Thus, Alternative 4 would probably not result in an appreciable change in benthic communities compared to current conditions under the No-action Alternative.

4.3.3.5 Alternative 5

Alternative 5 would limit the number of whales that may be struck, harvested and struck and lost in any one year to three, two and one, respectively. Year-round hunting would be allowed, making it likely that the full number of whales would be harvested. The expected number of hunting days would be 20 per year. Therefore effects on marine habitat and species under Alternative 4 would likely be less than those described under Alternative 2.

4.3.3.5.1 <u>Pelagic Environment</u>

Any direct disturbance effects under this alternative on fish and other pelagic species would likely be local and short-term, for the reasons described under Alternative 2. Similarly, for the reasons described under Alternative 2, any removal of whales under Alternative 5 is not likely to result in indirect ecological effects on pelagic communities. Because Alternative 5 would result in fewer hunting expeditions and fewer whales removed from the project area than Alternatives 2, 4, 3 and 6, it would have less potential for effects than these alternatives. Alternative 5 would probably not result in appreciable changes in the presence, distribution, or abundance of fish and other pelagic species in the project area compared to current conditions under the No-action Alternative.

4.3.3.5.2 <u>Benthic Environment</u>

Any direct disturbance effects under this alternative on benthic marine plant, macroalgal, shellfish, and kelp raft communities would be negligible relative to the high levels of background disturbance and the strong capacity of these species for growth and recolonization, as described under Alternative 2. Similarly, for the reasons described under Alternative 2, any removal of whales under Alternative 5 is not likely to result in indirect ecological effects on pelagic communities. Because Alternative 5 would result in fewer hunting expeditions and fewer whales removed from the project area than Alternatives 2, 4, 3, and 6, it would have less potential for effects than these alternatives. Thus, Alternative 4 would probably not result in an appreciable change in benthic communities compared to current conditions under the No-action Alternative.

4.3.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunt attempts and the same number of whales struck, harvested, and struck and lost as Alternative 3. Therefore effects on marine habitat and species under Alternative 6 would likely be the same as those described under Alternative 3, except that the geographic scope of potential effects would expand to the Strait of Juan de Fuca.

4.3.3.6.1 Pelagic Environment

As described under Alternative 3, the risk of direct disturbance of fish and other pelagic species under this alternative, although potentially higher than under Alternative 2, would still be minor, localized, and of short duration. Similarly, for the reasons described under Alternative 2, even though there is a greater chance that the full number of whales may be removed, any removal of whales under Alternative 6 is not likely to result in indirect ecological effects on pelagic communities. Thus, compared to the No-action Alternative, Alternative 6 is not likely to result in an appreciable change in the presence, distribution, or abundance of fish and other pelagic species in the project area.

4.3.3.6.2 Benthic Environment

As described under Alternative 3, the risk of direct disturbance of benthic marine plant, macroalgal, shellfish, and kelp raft communities under this alternative, although potentially greater than under Alternative 2, would be negligible relative to the high levels of background disturbance and the strong capacity of these species for growth and recolonization. Similarly, for the reasons described under Alternative 2, any removal of whales under Alternative 6 is not likely to result in indirect ecological effects on pelagic communities. Thus, Alternative 6 would probably not result in an appreciable change in benthic communities compared to current conditions under the No-action Alternative.

4.4 ENP Gray Whale

4.4.1 Introduction

This section addresses the potential for the alternatives to affect ENP gray whales at three scales: the ENP gray whale stock as a whole, whales using local summer feeding areas (specifically the Makah U&A and Oregon Southern Vancouver Island [ORSVI]), and individual whales. For the ENP gray whale stock as a whole, the analysis considers potential effects on abundance and viability. For whales using the Makah U&A and ORSVI summer feeding areas, the analysis considers potential effects on abundance and on distribution and habitat use. The reasons for analyzing effects in these two summer feeding areas are described more fully below. For effects on individual whales, the analysis considers time to death and hunting efficiency (the ratio of harvested to struck-and-lost whales) associated with the alternative methods of striking and killing whales. These methods are limited to what NMFS considers reasonable options for striking and killing whales (Section 2.4.5, Employ Different Hunting Methods), including using either a toggle-point harpoon as the primary striking method and .50 caliber rifle as the killing method, or using an explosive projectile as the striking and killing method.

Chapter 5 considers whether the effects on gray whales that might result from implementing any of the alternatives would be likely to have cumulative effects in the context of past actions, other contemporaneous actions, or reasonably foreseeable future actions that may affect gray whales, such as other human or natural sources of mortality, potential development in the project area, or global climate change.

4.4.2 Evaluation Criteria

Four criteria were used to determine the potential for effects on ENP gray whales under the alternatives: (1) change in abundance and viability of the ENP gray whale stock, (2) change in abundance of gray whales using the Makah U&A and ORSVI summer feeding areas, (3) change in distribution or habitat use of gray whales in the Makah U&A or elsewhere in the Pacific Coast Feeding Aggregation (PCFA) survey area, and (4) welfare of struck or harvested whales. The following sections discuss risks to gray whales at each of these scales and how the effects of the alternatives may be assessed and differentiated.

4.4.2.1 Change in Abundance and Viability of the ENP Gray Whale Stock

As described in Section 4.1, Introduction, the catch limit for the ENP gray whale stock set by the IWC would remain the same under all six alternatives – 620 whales over five years (annual average of 124), with a limit of 140 whales in any one year. The difference among the alternatives is how much of the catch would be allocated to the Makah Tribe. Because the ENP gray whale stock is a single stock, and all six alternatives contemplate the same overall catch limit for the stock, the effect on the abundance and viability of the ENP gray whale stock as a whole is likely to be the same under any alternative – there would be a decrease in abundance in any year by an average of 124 whales, and there would be no effect on the viability of the gray whale stock as a whole because the IWC catch limit is well within the level that is sustainable for the stock.

Section 3.4.3.4.1, Abundance, and Table 3-2 summarize NMFS' abundance estimates for the ENP gray whale stock as a whole. NMFS currently considers the ENP gray whale stock to be within its optimum sustainable population level (Section 3.4.3.4.5, Estimates of Carrying Capacity (K), OSP, and PBR) and considers a stock that is at OSP to be viable and remain viable as long as total human-caused mortality remains below PBR (Section 3.4.2.1.4, Defining and Calculating PBR, and Section 3.4.3.4.5, Estimates of Carrying Capacity (K), OSP, and PBR). NMFS has calculated an acceptable PBR for the ENP gray whale stock as 417 whales per year. Under all of the alternatives, the abundance of the gray whale stock would be reduced by an average of 124 whales each year, and no more than 140 whales in any one year. Because this mortality level is well below the PBR of 417, none of the alternatives would be expected to change the viability of the ENP gray whale stock.

Hunt-related activities, particularly pursuit and unsuccessful harpoon attempts, may cause stress that increases whales' susceptibility to predation or disease, ultimately increasing the level of mortality beyond whales directly killed during hunting (Section 3.4.3.5.2, Whale Response to Being Pursued). Gray whales being pursued by whale-watching vessels have been observed to change course and alter swimming speed and respiratory patterns, potentially indicating stress (Section 3.4.3.6.6, Vessel Interactions). The Tribe estimates that over the five-year period of its proposed hunting, a maximum of 700 whales might be approached and 140 whales exposed to unsuccessful harpoon attempts. As described above, if no harvest is allocated to the Makah Tribe, the entire IWC catch limit of 620 gray whales over five years would be available for harvest by the Chukotka Natives. No information is available on the proportion of whales approached and subjected to unsuccessful harpoon attempts in the Chukotkan hunt. Such information would allow a comparison of the ENP gray whale stocks' likely exposure to stressful hunt-related activities under any of the action alternatives (involving a Makah hunt) versus the No-action Alternative (involving only a Chukotkan hunt). However, given the total number of ENP gray whales hunted, there is likely to be no appreciable difference in stress-related mortality between an alternative in which the Chukotka Natives harvest an average of 124 whales per year while the Makah harvest none (the No-action Alternative), and alternatives in which the Chukotka Natives harvest an average of 120 whales per year while the Makah harvest 20 (the most the Makah can harvest under any of the action alternatives).

4.4.2.2 Change in Abundance of Gray Whales Using the Makah U&A or ORSVI Survey Areas

As noted in Section 4.1, Introduction, all six alternatives include the same level of harvest from the ENP gray whale stock as a whole. The alternatives vary, however, in the number of whales that would be harvested from the Makah Tribe's U&A. Under Alternatives 2, 3, 4, and 6, 20 of the 620 whales allowed under the IWC five-year catch limit would be allocated to the Makah Tribe (with an annual maximum limit of five) and subject to harvest in the Tribe's U&A. Under Alternative 5, 10 of the 620 whales would be allocated to the Makah Tribe (with an annual maximum limit of two). In addition, Alternatives 2 to 6 vary in (1) the number of whales that may be struck and lost during hunting, (2) the number of identified whales from the PCFA survey areas that may be harvested, and (3) the timing and location of hunting. These variations may have different effects on the abundance of gray whales using local survey areas.

This analysis considers effects on abundance of gray whales in two local survey areas – the Makah Tribe's U&A (which includes the northern Washington coast and Strait of Juan de Fuca survey areas), and ORSVI. As described in Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, this analysis considers these local survey areas as a way to evaluate local effects of the alternatives. The survey areas themselves are not biological designations but have been defined by researchers because whales can be found using these areas or because of some management objective relevant to these areas (such as the Tribe's proposed hunt).

The court in *Anderson v. Evans* (2004) found that NMFS' previous environmental review did not adequately consider potential local effects of a Makah gray whale hunt because it did not address the number of gray whales in the area from which they would be removed (the Makah U&A) (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Accordingly, this analysis addresses likely effects of the alternatives on abundance of ENP gray whales in the Tribe's U&A. Although Alternatives 2 through 5 restrict hunting to the coastal portion of the Tribe's U&A, and only Alternative 6 allows hunting in the Strait of Juan de Fuca portion of the Tribe's U&A, the analysis of all of the alternatives considers abundance in both portions of the Tribe's U&A. This is because of the overlap of whales identified in both areas. If there were a decrease in abundance of whales using the coastal portion of the Tribe's U&A under alternatives that limit hunting to that area, it could also result in a decrease in abundance of whales using the Strait of Juan de Fuca. The joint consideration of these two areas in evaluating gray whale abundance in the Makah U&A is in contrast to the individual consideration they receive in evaluating distribution and habitat use in the Makah U&A (Section 4.4.2.3, Change in Distribution or Habitat Use).

In addition to the Makah U&A, this analysis focuses on the ORSVI survey area. Calambokidis et al. (2004a) recommended using the ORSVI as a logical and reasonable management area for considering impacts of gray whale harvests in the Makah U&A because of the relatively high rates of interchange between the ORSVI survey area and the Makah U&A. About 50 percent of whales seen in the ORSVI are also seen in the northern Washington coast/Strait of Juan de Fuca survey areas, compared to about 30 percent of whales seen in the PCFA also being seen the northern Washington coast/Strait of Juan de Fuca survey areas (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). They also recommended using the PBR method for estimating a sustainable level of removal of whales from the ORSVI. Because Calambokidis et al. (2004a) consider the ORSVI survey area to be appropriate for managing a gray whale harvest in the Makah U&A, because the Tribe's proposal adopts that recommendation, and because the MMPA includes the PBR approach as a management tool, this EIS evaluates the alternatives by comparing whale mortalities that would occur under each alternative to the PBR level that would be appropriate for the abundance of whales in the ORSVI.

The analysis also discusses effects on whales identified in the larger PCFA survey area, though not in the same level of detail as whales in the Makah U&A and ORSVI survey areas. This is the area NMFS considered relevant in its 2001 EA. It is also relevant to the Makah's proposal (Alternative 2) because the Tribe proposes to set an allowable bycatch level that would apply to any PCFA whale.

This portion of the analysis considers change in abundance in these local survey areas that might result if whales are killed during hunting (either harvested or struck and lost). It is also possible that animals could stop using an area because of the disturbance associated with a hunt. That possibility is evaluated in Section 4.4.2.3, Change in Distribution or Habitat Use. Section 4.1, Introduction, describes both the maximum and the likely number of PCFA whales that could be killed under each alternative from a combination of being harvested or struck and lost. That information is summarized in Table 4-2.

TABLE 4-2. NUMBER OF PCFA, ORSVI AND MAKAH U&A WHALES THAT MAY BE KILLED UNDER EACH ALTERNATIVE (MAXIMUM AND LIKELY)

Alternatives	No-Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
PCFA Whales		Annual/Five-Year	Annual/Five-Year	Annual/Five-Year	Annual/Five-Year	Annual/Five-Year
Maximum	0	4/20	Up to 7/35	4/20	Up to 3	Up to 7/35
Likely*	0	1.25/6.27	Up to 7/35	1.25/6.27	Up to 3	Up to 7/35
ORSVI Whales						
Maximum	0	4/20	Up to 7/35	4/20	Up to 3	Up to 7/35
Likely*	0	1.25/6.27	unknown**	1.25/6.27	unknown**	unknown**
Makah U&A Whales						
Maximum	0	4/20	Up to 7/35	4/20	Up to 3	Up to 7/35
Likely*	0	0.88/4.38	unknown**	0.88/4.83	unknown**	unknown**

* These numbers represents an estimate based on early season photo-identification data collected from 1998-2005 and on an assumption of seven whales struck each year (Calambokidis 2007). For the reasons described in section 4.1.2, Alternative 2, this assumption is conservative.

** Alternatives 3, 5, and 6 would allow year-round hunting. Without knowing when the Tribe would hunt, it is not possible to estimate a likely number of identified whales that would be killed, so only the maximum is estimated.

Additional stress-related mortalities resulting from pursuit or unsuccessful harpoon attempts are possible (Section 4.4.2.1, Change in Abundance and Viability of the ENP Gray Whale Stock), but no information is available or could reasonably be obtained that would support an estimate of stress-related mortality of identified summer-feeding whales.

Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, describes gray whale use of local survey areas during the summer feeding period. As described in that section, during 1 June-30 November for 1998-2005, 464 unique whales were observed in the PCFA, with 311 observed within the smaller ORSVI region, and 115 observed within the smaller Makah U&A (Table 3-4). Tables 3-2 through 3-4 also report the number of newly observed whales in each survey area, and newly observed whales that then return in a subsequent year to each survey area. These tables show that new whales visit the PCFA, ORSVI, and Makah U&A survey areas each year, and many of those return in subsequent years.

In any given year in which a harvest occurred under Alternatives 2 to 6, the abundance of gray whales in the Makah U&A and ORSVI survey areas would be at least temporarily reduced by the number of identified whales killed (either harvested or struck and lost). It is possible that an identified whale removed from these areas could be replaced during the same year by a whale from outside the area. Calambokidis et al. (2004a) observed that many whales feeding during the summer throughout the PCFA survey area move great distances among areas, and that the presence of prey is likely what attracts whales to certain areas. During the course of the summer feeding period it is therefore possible that whales from outside the Makah U&A or the ORSVI survey areas would be traveling through these areas and stay to feed on available prey. Whether replacement would occur in the same year would depend on the number of whales removed, the availability of prey within the local survey areas relative to its availability in outside areas, and the opportunity for whales from outside the area to discover an unexploited source of prey. As a matter of probabilities, the smaller the number of whales removed, the greater the chance a removed whale would be randomly replaced by a new whale in the same year. Thus alternatives with lower rates of removal are likely to have less effect on gray whale abundance in local survey areas during the year in which hunting occurs.

In subsequent years, it is likely that new whales would replace identified whales removed from the Makah U&A or the ORSVI survey areas, because of the recruitment of new whales, but it is difficult to predict at what rate this would occur. There are no population-driven reasons why new whales would not replace whales that were removed: (1) gray whales identified as using local survey areas are not genetically distinct from the ENP gray whale stock as a whole, (2) there is no evidence of familial recruitment in the local survey areas, and (3) PCFA whales are not demographically independent from the ENP gray whale stock. Calambokidis et al. (2004a) proposed that individuals recruit into the local survey areas in the southern portion of the summer range from the migratory population as feeding habitat becomes available along the migration route. Alternatives with lower rates of removal are likely to have less effect on gray whale abundance in local survey areas in subsequent years because there are fewer whales to replace.

Over the long term, assuming prey continues to be available in these areas, it is likely that whales removed from the Makah U&A or ORSVI survey areas would be replaced, although it is not possible to predict how long it would take for replacement to occur. Regardless of whether hunting occurs, gray whale use of the Makah U&A or ORSVI survey areas can be expected to fluctuate over time as prey availability fluctuates in these areas relative to other feeding areas.

4.4.2.2.1 PBR of Whales in the ORSVI Survey Area

As described above, this analysis also considers the number of PCFA whales that might be removed under each alternative relative to the Tribe's proposed allowable bycatch level, which is based on a PBR that would be appropriate for the abundance of ORSVI whales. This analysis is included because it is an important component of the Tribe's proposal, because the MMPA explicitly adopts a PBR approach to marine mammal management, and because it provides continuity with the PBR method NMFS used in its 2001 EA. NMFS' 2001 EA focused on a PBR appropriate for the abundance of PCFA whales. The present analysis focuses instead on a PBR appropriate for ORSVI whales because that is what the Tribe proposed and what Calambokidis et al. (2004a) recommended. Alternatives 2 and 4 would adopt the Makah proposal to set an allowable bycatch level for PCFA whales that is established annually using the PBR approach applied to the minimum estimated abundance of ORSVI whales. The allowable bycatch level would be set each year based on an annually updated minimum estimate of abundance of ORSVI whales[5]. If the Tribe harvested a whale identified from anywhere in the PCFA survey area (an area larger than the ORSVI survey area and containing more identified whales), those would be counted against the allowable bycatch level.

Under the Makah proposal, the allowable bycatch level for PCFA whales would be adjusted annually based on the estimated minimum abundance of ORSVI whales. Using the Tribe's proposed method (which results in a 2.35 percent rate) and the current minimum abundance of ORSVI whales (106), the annual PBR would be 2.49 and the five-year PBR would be 12.45 (2.49 times five years). As described above, struck and lost whales may be ORSVI (or PCFA) whales, but would not count toward the allowable bycatch level under the Tribe's proposal. Section 4.1, Introduction, and Table 4-2, describe the maximum and likely number of ORSVI whales killed under each of the five action Alternatives (2 to 6). Under Alternatives 2 and 4, the maximum number of ORSVI whales killed could, over the five years of hunting, be 15, which would exceed by 2.5 whales the PBR level resulting from the Tribe's proposed method. The likely number of PCFA whales killed, however, would be 5.6 over five years, well under the 12.5 PBR level resulting from the Tribe's proposed method.

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[5] As described in Section 3.4.3.3.1, Southern Portion of the Summer Range, the abundance of ORSVI whales is not the total number of whales identified in the ORSVI, but the number of whales observed in more than one year, or observed over a long enough period during a single year that it could be predicted it would return. Subtracted from this is an estimated annual mortality based on the mortality rate for the entire ENP gray whale stock.

Alternatives 3 and 6 would allow the same number of whales to be harvested, struck and struck and lost as Alternatives 2 and 4, but would not place limits on the hunting season or the harvest of PCFA whales. Under these alternatives, the number of whales killed each year from the PCFA, ORSVI, and/or Makah U&A survey areas would depend on when the Tribe chose to hunt. Any whales killed during the period June 1 through November 30 would, by definition, be Makah U&A whales (as well as ORSVI and PCFA whales). For a whale killed outside of this period, as described above, there would be some probability it would be an identified summer-feeding whale (18 percent chance of a PCFA whale, 16 percent chance of an ORSVI whale, and 11 percent chance of a Makah U&A whale). Without knowing when the Tribe would hunt, it is not possible to estimate the likely number of identified whales that would be removed each year, so this analysis considers the maximum potential removals, which would be seven annually and 35 over five years (Table 4-2). This five-year number would exceed the five-year PBR of 12.5 for ORSVI-identified whales.

Alternative 5 would limit the number of whales that could be harvested in any year to two and the number that could be struck to three, thus limiting the total number potentially killed each year to three. As described above for Alternatives 3 and 6, all of these could be PCFA whales. The five-year number of 15 identified whales would exceed the PBR of 12.5 for ORSVI whales by 2.5 whales over five years.

Concerns about exceeding the PBR under any of the action alternatives could be addressed through a variety of methods, some of which are incorporated in the Tribe's proposal (for example, by limiting the timing and location of the hunt, and the number of identified whales that may be landed). Estimates of the proportion of PCFA whales present in the Makah U&A during April and May (the time when hunting is most likely to occur under Alternatives 2 and 4) are based on a small number of observations. Improved monitoring in the Makah U&A during April and May could increase confidence about the likelihood that any whale struck and lost was a PCFA whale.

Concerns about exceeding the Tribe's proposed PBR could also be addressed for any alternative by reducing the number of whales that could be struck and lost (and therefore the number of whales of unknown identity) or, for Alternatives 2 and 4, the number of identified whales that could be killed and landed. For Alternatives 3, 5, and 6 (which permit hunting year-round), concerns about exceeding PBR could be partially addressed by requiring some portion of the allowable harvest to be taken outside the summer feeding period.

4.4.2.3 Change in Distribution or Habitat Use

This analysis considers the potential for ENP gray whales to change their distribution and habitat use in response to a tribal hunt under the action alternatives. Responses could include changes in the distance whales travel from shore during migration; changes in numbers or location of whales feeding within the Makah U&A or elsewhere in the PCFA survey area; changes in the amount of time spent by whales feeding while in the Makah U&A or elsewhere in the PCFA survey area; changes in the numbers of whales using an area; or changes in the approachability of whales.

Gray whales being pursued by whale-watching vessels have been observed to change course and alter swimming speed and respiratory patterns temporarily (Section 3.4.3.6.6, Vessel Interactions). Studies of whale-watching activities in the lagoons of Baja California documented that gray whales were less likely to flee as the season progressed (Section 3.4.3.6.5, Offshore Activities and Underwater Noise). It is reasonable to expect that whales approached by Makah whale-hunting vessels would react in a similar, temporary manner. It is uncertain what the longer term effects would be on whales exposed to repeated approaches. The studies of whale-watching activities suggest the whales might become habituated and have less of a reaction the more frequently they are approached. It is uncertain how whales would react to unsuccessful harpoon attempts, but the reaction may be similar to that observed in whales that are tagged or biopsied. Such reactions are likely to be dramatic but temporary changes in behavior (Section 3.4.3.6.6, Vessel Interactions). Whales may be less likely to habituate to unsuccessful harpoon attempts than to approaches of vessels. It is unknown whether whales in the vicinity of successful harpoon attempts will develop an association between vessel approaches and harpoon strikes and over time begin to avoid vessels.

During migration, it is uncertain what factors affect gray whale distribution and habitat use. While there is evidence that gray whales will alter course or swimming speed in response to disturbances, there is no evidence that the disturbance is more than temporary (Section 3.4.3.6, Known and Potential Anthropogenic Impacts). Clarke and Moore (2002) found there was little evidence that gray whales disturbed by human activities travel far in response or remain disturbed for long.

During feeding, the factor most strongly affecting gray whale distribution and habitat use is likely the availability of prey. Darling et al. (1998) and Moore et al. (2007) document abandonment of feeding areas and establishment of new feeding areas linked to natural variation in prey availability. Feeding gray whales change location and habitat to exploit the optimum prey species at any one time, based on abundance, density, size, caloric content, and predation pressure. Such factors may vary by season and year, depending on environmental variability and the population dynamics of prey (Section 3.4.3.1.3, Feeding Ecology and Role in the Marine Ecosystem).

Gray whales using the southern portion of the summer range tend to move up and down the coast during the feeding period, presumably searching for prey. Some whales remain in local areas for weeks or months; others may be present only for brief periods (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). It is possible that a hunt and associated activities in the Makah U&A might disturb whales, causing them to move elsewhere in search of feeding opportunities away from these activities. The severity of this effect would depend, in part, on the extent of the disturbance. Thus alternatives that result in more whales approached or subjected to harpoon attempts, or result in more days of hunting, are likely to cause more disturbance of feeding gray whales. The severity of the effect would also depend, in part, on the sensitivity of gray whales to disturbance in feeding areas. Available information indicates that feeding gray whales may not abandon feeding areas because of hunt-related disturbance. The pursuit of gray whales during the aboriginal hunt in the Chukotkan region of Russia does not appear to have diminished the opportunity for that subsistence hunt, as it has been ongoing for several years. This indicates that, at least in one part of their summer range, gray whales have not abandoned areas where they are subject to hunting.

Concerns about whales avoiding or abandoning the Makah U&A as a result of hunt-related activity could be addressed by continued monitoring aimed at detecting changes in whale distribution and habitat use (although changes in distribution would more likely be related to changes in prey distribution rather than hunt-related activity). Other options to address this concern include setting limits on the numbers of whales that could be approached or subjected to strike attempts or reducing the number of whales that may be struck and lost.

4.4.2.4 Method of Striking and Killing; Time to Death; Hunting Efficiency

The Tribe proposes to hunt gray whales using a toggle-point harpoon to strike and secure whales and a .50 caliber rifle to kill those that have been struck and secured. The Tribe also proposes a number of measures to contribute to the safety and efficiency of the hunt, including a minimum distance from a whale before firing, minimum visibility conditions under which a weapon may be fired, motorized chase vessels to pursue whales and provide a shooting platform and to tow killed whales to shore, and training for hunters. In addition to the Tribe's proposed hunting weapons, this analysis considers the option of using explosive projectiles to strike and kill gray whales, either attached to a hand-thrown harpoon or delivered by a shoulder gun. These techniques have been used in the Chukotka Native gray whale hunt. Explosive projectiles may contain black powder or penthrite. Section 2.3.3.2.5, Overview of Proposed Hunting Method, describes these hunting methods, either of which may be used with any of the action alternatives (Alternatives 2 through 6).

This analysis examines the manner of death and the time to death of individual whales using either of two different general hunting methods: (1) a toggle-point harpoon for striking whales and a .50 caliber rifle for killing whales, or (2) an explosive projectile for both striking and killing whales, delivered either using a hand-thrown darting gun (a striking weapon that attaches a line and floats to the whale), or a shoulder gun (a killing weapon that does not secure the whale and is not used until the whale is secured). It also examines the potential for individual whales to be struck and lost, compared to whales struck and successfully landed (referred to as hunting efficiency). The more efficient the hunt, the greater the likelihood that fewer whales would be struck and killed in reaching the hunting quota, thus limiting impacts to fewer individual whales.

This section does not focus on the welfare of individual whales (Section 3.4.3.5, Welfare of Individual Whales) that would be the target of pursuit or unsuccessful harpoon attempts. Welfare effects on those whales are considered at the scale of the ENP gray whale stock and of whales that use local survey areas (Section 4.4.2.1, Change in Abundance and Viability of the ENP Gray Whale Stock, and Section 4.4.2.2, Change in Abundance of Gray Whales Using the Makah U&A or ORSVI Survey Areas) (this section does, however, consider whether approaches by Makah hunting vessels and unsuccessful harpoon attempts would affect gray whale distribution and habitat use).

4.4.2.4.1 Method of Striking and Killing, Time to Death

A toggle-point harpoon penetrates the epidermis and blubber of the whale and toggles open to secure the whale. The area of trauma is the area penetrated by the harpoon. There is evidence that a harpoon strike causes pain as whales may respond to being struck by diving, thrashing, or ramming a boat (Section 3.4.3.5.3, Whale Response to Being Struck). The .50 caliber bullet is targeted at the brain or central nervous system of the whale and causes death by penetrating and damaging the brain or central nervous system. Like the harpoon strike, a bullet causes trauma in the area of penetration. Time to death for the whale killed in the Makah hunt in 1999 was 8 minutes from the time the whale was struck with the harpoon until it was apparently rendered insensible from the second of two rifle shots. Time to death for the whale killed in the unauthorized hunt in 2007 was 11 hours from the time the whale was struck (or the first shot was fired) until the whale apparently died and sank. In the 2006 Chukotka Native hunt, for whales killed using rifles only as the killing weapon, they reported an average time to death of 47 minutes for 40 whales (minimum 5 minutes, maximum 3 hours and 20 minutes, median 35 minutes). It is reasonable to expect that average time to death in a Makah hunt using a .50 caliber rifle as the killing weapon would be shorter than average time to death in the Chukotka Native hunt because the Makah Tribe would use a higher-caliber rifle, which would kill a gray whale more effectively than a lower-caliber rifle used by the Chukotka Native hunters (Section 3.4.3.5.4, Method of Killing and Time to Death). It is also possible that other requirements of the Makah hunt – minimum visibility conditions, minimum shooting distance, use of a look-out, and training – would result in a shorter time to death than documented in the Chukotka Native hunt.

It is difficult to compare the time to death of the whale during the unauthorized Makah gray whale hunt in 2007 to expected time to death in a future authorized hunt. During the 2007 hunt many of the procedures proposed by the Makah were not followed (such as training of the shooter). In addition, the at-sea intervention of the Coast Guard and NOAA's subsequent deliberation regarding what action to take with the wounded whale potentially prevented the tribal members or tribal authorities from taking further action to ensure the whale was killed more expeditiously. In addition, it is not known what ammunition the unauthorized hunters used nor the number of times that each rifle was fired. The experience of the 2007 unauthorized hunt emphasizes the importance of adopting and enforcing procedures governing the safety and humaneness of the hunt, in the event a hunt is authorized.

Concerns about time to death for individual whales, particularly in light of the unauthorized Makah hunt in September 2007, could be addressed by improved enforcement of the regulations proposed by the Makah to govern a hunt, including training of marksmen, maintenance and control of weapons and ammunition, and requirements for a chase boat with a look-out. It is uncertain whether use of an explosive projectile could reduce time to death. Other options for reducing time to death include improved enforcement of the moving exclusionary zone (MEZ) and allowing a hunt during better weather conditions (Alternatives 3, 5, and 6).

The alternative method of striking and killing whales is the use of explosive projectiles, delivered either by a hand-thrown darting gun or a shoulder gun. Explosive projectiles cause more extensive trauma at the site of penetration than a harpoon or bullet and can cause trauma at a farther distance from the site of penetration. Unlike a toggle-point harpoon, which would not kill a whale immediately, an explosive projectile used for striking a whale may result in instantaneous or nearly instantaneous insensibility or death. In 2006, for whales killed using a darting gun with a black powder explosive projectile, Chukotka Native hunters reported an average time to death of 32 minutes for 88 whales (minimum 3 minutes, maximum 3 hours, median 30 minutes). In field trials testing the use of penthrite grenades in the Alaska bowhead hunt, time to death was on average 50 percent of the time to death using black powder grenades. It is uncertain what the average time to death would be for gray whales killed in a Makah gray whale hunt using explosive projectiles as the striking and killing weapon, though it is possible that average time to death would be lower than with the alternative method (toggle-point harpoon and rifle), because the striking weapon has the potential to quickly kill the whale or render it insensible.

4.4.2.4.2 Timing of Hunt and Time to Death

Regardless of the method selected, alternatives that would allow year-round hunting (Alternatives 3, 5, and 6) might result in shorter times to death for individual whales than alternatives that would limit hunting to the period of December 1 through May 31 (Alternatives 2 and 4). This is because the limited hunting season would include periods of rougher weather and sea conditions, which might hamper the accuracy of hunters using harpoons, rifles, or explosive projectiles. Less accurate weapon strikes would likely increase the time to death (Section 3.4.3.5.4, Method of Killing and Time to Death).

4.4.2.4.3 Hunting Efficiency

The proportion of gray whales struck and lost in the Chukotka Native hunt averaged about 4 percent (approximately a 95 percent efficiency rate) over three hunting seasons from 2004 to 2007. The Russian Federation reported that Chukotka Native hunters experienced fewer whales struck and lost when explosive projectiles were used. Given the lack of experience with a Makah gray whale hunt, it is not possible to predict the proportion of whales likely to be struck and lost under any of the alternatives, nor is it possible to predict the relative proportion of struck and lost whales using the alternative hunting methods. The Makah proposal (Alternative 2) would allow for 15 whales struck and lost over 5 years and 20 harvested (a 57 percent efficiency rate).

Concerns about hunting efficiency could be addressed by decreasing the allowable numbers of whales struck and lost in a Makah hunt. Concerns could also be addressed by allowing hunting during more favorable weather conditions. Regardless of the hunting method selected, alternatives that would allow year-round hunting (Alternatives 3, 5, and 6) might result in greater hunting efficiency than alternatives that would limit hunting to the period of December 1 through

May 31 (Alternatives 2 and 4). This is because the limited hunting season would include periods of rougher weather and sea conditions, which might hamper the accuracy of hunters using harpoons, rifles, or explosive projectiles. Less accurate strikes might result in more whales struck and lost. In addition, rough weather conditions might make it more difficult to land a killed whale, potentially increasing the proportion of struck and lost whales.

4.4.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect the ENP gray whale stock as a whole; gray whales in the Makah U&A, ORSVI, or elsewhere in the PCFA survey area; gray whale distribution and habitat use within the Makah U&A or elsewhere in the PCFA survey area; and the manner and time to death of individual whales. The risk of adverse effects on the ENP gray whale stock as a whole would be small under any of the alternatives, including the No-action Alternative. This is because the IWC catch limit remains the same under all alternatives, so the same total number of whales is likely to be removed from the stock by hunting. The difference between the No-action Alternative and the action alternatives is that under the action alternatives, some of that harvest would take place in the Makah U&A. Thus none of the action alternatives would result in an increased risk to the ENP gray whale stock as a whole, beyond the No-action Alternative.

The lowest risk to the abundance of whales in the Makah U&A and ORSVI survey areas would occur under the No-action Alternative, under which no Makah whale hunts would be authorized. It is unlikely that Makah U&A whales and ORSVI whales would be present in the area of the Chukotka hunt and thus killed under the No-action Alternative. In contrast, the risks to the abundance of whales in the Makah U&A and ORSVI survey areas would be higher under the action alternatives due to the likelihood that some Makah U&A whales and ORSVI whales would be killed in a Makah hunt. Alternatives 3 and 6 would carry the greatest risks to the abundance of whales in the Makah U&A and ORSVI survey areas because no seasonal restrictions would be imposed on whale hunting activities, increasing the chances of a Makah U&A or ORSVI whale being killed, and because there would be no limits on the number of PCFA whales that could be killed. Alternatives 2 and 4 would carry the least risk to the abundance of whales in the Makah U&A and ORSVI survey areas because hunting would be limited to the migration period and because a limit would be set on the number of PCFA whales that could be harvested. Alternative 5 would carry an intermediate risk to the abundance of whales in the Makah U&A and ORSVI survey areas. The lower total limit on strikes would limit the number of whales potentially killed to three per year, but all three whales could be Makah U&A and ORSVI whales because hunting would be allowed year round and there would be no limits on the numbers of PCFA whales that could be harvested.

4.4.3.1 Alternative 1

Under the No-action Alternative, NMFS would not allocate a gray whale quota to the Makah Tribe, and no authorized hunting by the Makah would occur. As described in Section 4.1, Introduction, the current annual and five-year IWC allowable catch limits set for ENP gray whales are based on a joint request of the Russian Federation (for Chukotka Natives) and the United States (for the Makah Tribe). The number of gray whales that may be removed from the ENP stock during the five-year period from 2008 through 2012 would be no more than the catch limit of 620 whales, with no more than 140 whales taken in any one year. The effects on the abundance and viability of the ENP gray whale stock would not differ from current conditions; current data indicate that the ENP gray whale population is at or near the upper limit of its OSP (Section 3.4.3.4.4, Population Dynamics and Trends). The IWC catch limit of not more than 140 whales per year is well below the limit NMFS calculates as the PBR for this stock. It is not possible to estimate the difference in stress-related mortality that the ENP gray whale stock would experience if 8 to 20 whales are killed in the Chukotka hunt under the No-action Alternative instead of being killed in a Makah hunt under the action alternatives.

Under the No-action Alternative, ENP gray whale health, abundance, and habitat conditions would remain as the status quo for the stock as a whole and for whales in the Makah U&A and ORSVI survey areas. Domestic prohibitions on gray whale take pursuant to Section 101 of the MMPA would continue, would require authorization from NMFS, and would be subject to public review.

Factors that could cause a change in distribution or habitat use, such as variability in prey abundance from environmental perturbation, vessel traffic and noise, or commercial fisheries, would similarly be expected to remain at present levels.

4.4.3.2 Alternative 2

Under Alternative 2, whale hunting may occur from December 1 through May 31 in the Makah U&A. An average of four whales could be harvested by the Makah, seven struck, and three struck and lost per year. During any five-year period, up to 20 whales might be harvested, with 35 struck and 15 struck and lost. Whales that are struck are considered killed. As many as 140 whales may be approached by whale hunting vessels in any one year and up to 28 whales may be exposed to unsuccessful harpoon attempts. With seven strikes allowed, there could be a maximum of 28 rifle shots fired or 21 grenade explosions. Inclement weather conditions during the hunting season might practically limit hunting to a total of 7 to 30 days during April and May. Given the limited number of actual hunting days available under Alternative 2, the Tribe might not be able to harvest the full number of whales allowed.

4.4.3.2.1 Change in Abundance and Viability of ENP Gray Whales

The potential direct and indirect mortality resulting from the whale hunt and hunt-related activities under Alternative 2 would be unlikely to change ENP gray whale stock abundance or viability compared to the No-action Alternative. As noted in Section 4.1, Introduction, the catch limit for the ENP gray whale stock set by the IWC would not change under this or any of the other alternatives, thus the same number of ENP gray whales would likely be harvested over five years under Alternative 2 as under the No-action Alternative. The ENP gray whale stock is within its OSP range (Section 3.4.3.4, Current Status of the Gray Whale Population), and the anticipated annual gray whale mortality under Alternative 2 (or any of the alternatives, including the No-action Alternative) would not exceed PBR for the ENP gray whale stock. If a Makah hunt for 20 whales over five years resulted in a higher level of stress-related mortality than would occur if those 20 whales were harvested in a Chukotkan hunt under the No-action Alternative, the difference is unlikely to have an appreciable effect on the abundance and viability of the ENP gray whale stock as a whole. This is because the stress-related mortality associated with harvesting 20 whales over five years is likely to be minor in the context of the existing Chukotkan harvest level of 600 whales over five years.

4.4.3.2.2 Change in Abundance of Gray Whales Using the Makah U&A and ORSVI Survey Areas

Under Alternative 2 there could be an increased risk to abundance of gray whales using the Makah U&A and ORSVI survey areas, compared to the No-action Alternative, though the increased risk would be small. Under Alternative 2, the Makah hunt would occur between December 1 and May 31, during the migration period, to reduce the likelihood of killing identified summer-feeding whales. As described in Table 4-2, the maximum number of Makah U&A whales killed would be 4 per year and 20 over five years and the likely number would be 0.88 per year and 4.38 over five years. The maximum number of ORSVI whales would be 4 per year or 20 over five years and the likely number would be 1.25 per year or 6.27 over five years.

It is uncertain whether other whales would take the place of killed Makah U&A whales or ORSVI whales during the year in which they were killed. Under Alternative 2, the most likely scenario is that about one Makah U&A whale or ORSVI whale would be killed annually. Whales identified in the PCFA survey area could take the place of whales removed from the ORSVI, and whales identified in the ORSVI survey area could take the place of whales removed from the Makah U&A. Gray whales feeding in the southern portion of the summer range move great distances within a year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Thus it is reasonable to expect that one removed whale could be replaced in the year in which it was removed.

In subsequent years, it seems likely that a whale removed under Alternative 2 would be replaced. As described in Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, Calambokidis et al. (2004a) propose that whales likely recruit to the Makah U&A or other parts of the PCFA survey area from the migratory population, as feeding habitat becomes available along the migration route. From the 1999-2005 data, an annual average of 4.66 new whales (Table 3-4) were seen in the Makah U&A and were subsequently seen in another year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use) which demonstrates that the observed level of annual recruitment is greater than the likely and maximum number of removals from the entire PCFA. The recruitment numbers in the ORSVI and PCFA were even larger. Therefore, replacement in subsequent years appears to be almost certain. If for some reason new whales did not take the place of killed whales in subsequent years, the Tribe’s allowable bycatch level would decrease over time, because of the Tribe’s proposal to base its allowable bycatch limits on the annually-updated lower abundance estimate of whales identified in the ORSVI survey area.

Compared to the No-action Alternative, in which no Makah U&A or ORSVI whales are likely to be killed by hunting, Alternative 2 represents an increase in risk to the abundance of gray whales using the Makah U&A and ORSVI survey areas during the summer period. The risk of a change in abundance compared to the No-action Alternative is slight when considered in the context of the numbers of whales available to replace killed whales.

PBR of Whales in the ORSVI

This EIS also evaluates each alternative relative to the PBR calculated for whales identified in the ORSVI survey area, as proposed by the Makah. As described in Section 4.1, Introduction, the PBR for whales identified in the ORSVI survey area, under the Tribe’s proposed method, would be 2.5 whales per year, or 12.5 whales over five years. As described in Table 4-2, the most likely scenario is that under Alternative 2 about one ORSVI whale would be killed each year (estimated 1.12) and about six ORSVI whales would be killed over five years (estimated 6.27). If the maximum potential number of ORSVI whales were killed under Alternative 2, that number would exceed the PBR level of whales in the ORSVI (a total of 20 whales over five years, versus a PBR of 12.5 whales over five years). This risk may be mitigated by the fact that under Alternative 2, harvest of a whale identified anywhere in the PCFA survey area (as opposed to only whales from the smaller ORSVI) would be counted against the allowable bycatch level.

Implementing Alternative 2 would increase the risk of exceeding the PBR of whales identified in the ORSVI survey area compared to the No-action Alternative. Under the No-action Alternative, there is no possibility of exceeding the PBR of ORSVI whales because none would be hunted. Under Alternative 2, the most likely scenario is that the PBR of ORSVI whales would not be exceeded (6.27 whales would be killed over five years compared to a PBR of 12.5 whales over five years); under the maximum scenario, the PBR of ORSVI whales could be exceeded (20 whales killed over five years compared to a PBR of 12.5 whales over five years).

4.4.3.2.3 Change in Distribution or Habitat Use

There is a risk that implementing Alternative 2 could cause a change in gray whale distribution or habitat use in the coastal portion of the Makah U&A or elsewhere in the PCFA survey area compared to the No-action Alternative. Gray whales that are approached by vessels often exhibit temporary behavioral responses, such as changing course, swimming speed, and respiratory patterns (Section 3.4.3.6.6, Vessel Interactions). There is no evidence that gray whales have altered their distribution or habitat use in lagoons in their winter range in response to the presence of whale-watching vessels (Section 3.4.3.6.6, Vessel Interactions). While some researchers have suggested that gray whales may have altered their migration distance from shore in response to vessels and other human activity, other researchers concluded there is no evidence suggesting such a relationship (Section 3.4.3.6.6, Vessel Interactions). Little information is available on interactions between vessels and gray whales in their summer range. No studies are available regarding changes in distribution or habitat use of gray whales feeding in areas where a hunt by Chukotka Natives hunt has been ongoing for many years (Table 3-49), suggesting whales continue to be available for harvest in feeding areas that are regularly harvested. Thus available information indicates that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Migrating Whales

Migrating whales travel 1 to 2 miles offshore on their northward migration and may travel further from shore during the southward migration (Section 3.4.3.1.4, Seasonal Migrations). Because hunting under Alternative 2 would occur over a total of 7 to 30 days, primarily during April and May, it would affect mostly migrating whales. The number of whales potentially exposed to an approach by a Makah canoe (140 per year) represents less than one percent of the total gray whale population of 20,000, while the number exposed to unsuccessful harpoon attempts (28), would be an even smaller fraction. Thus while there is a potential for implementation of Alternative 2 to result in migrating gray whales changing their distribution or habitat use, the risk is likely small, suggesting that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Feeding Whales

During the hunting season under Alternative 2, 12.5 percent would be expected to be whales that have been seen in the Makah U&A during June 1 to November 30, while 17.9 percent would be expected from those seen in the larger ORSVI region (Section 3.4.3.3.2, Winter Range Distribution and Habitat Use). Thus of the 140 whales potentially approached, 17.5 (on average) would be expected from the Makah U&A, and 25 would be expected from the ORSVI region. Of the 28 whales potentially subjected to harpoon attempts, 3.5 would be expected from the Makah U&A, and five would be expected from the larger ORSVI region. Surveys have identified between seven and 31 whales in the coastal portion of the Makah U&A in a single year, and between 129 and 206 whales in the PCFA survey area in a single year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use).

It is reasonable to expect that approaches by Makah whale-hunting canoes would cause a disturbance similar to or less than that observed from approaches of motorized whale-watching vessels or vessels used for photo identification work. Thus whale response to approaches is likely to be temporary (minutes or hours). It is less certain what effect an unsuccessful harpoon attempt would have. For PCFA whales, the percentage of whales exposed to unsuccessful harpoon attempts is likely small enough to not affect overall gray whale use of the PCFA survey areas outside the Makah U&A. It is uncertain whether the intensity of unsuccessful harpoon attempts would result in more than a temporary disturbance of Makah U&A whales and cause them to avoid portions of the Makah U&A either for a short period (days to weeks), or a longer period (for example, over a period of years). As described in Section 4.4.2.3, Change in Distribution or Habitat Use, availability of prey may be the factor most strongly affecting gray whale distribution during feeding. If prey is available in the Makah U&A, hunting by the Makah Tribe might not result in either a short- or long-term response from summer-feeding whales. Many new whales are seen in the Makah U&A every year (Section 3.4.3.3.1, Summer Range Distribution and

Habitat Use). Thus even if some whales do abandon the area as a result of hunting disturbance, new whales that had not previously been exposed to hunting might come into the area.

The example of gray whale distribution in areas hunted by Chukotka Natives may be instructive in trying to predict whether there would be a change in distribution or habitat use of gray whales in the larger PCFA survey area. Scores of whales have been hunted by Chukotka Natives for several years (Table 3-43). The fact that whales continue to be available for harvest suggests that the disturbance associated with the Chukotka Native hunt may not have resulted in a change in distribution or habitat use. On the other hand, gray whales using the southern portion of the summer range tend to move up and down the coast extensively during the feeding period, presumably searching for prey (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Moreover, the areas under consideration for hunting are a small portion of the whales' summer range; if there are other feeding areas that are not subject to hunting disturbance, the whales can and may easily move to those other areas. Thus available information indicates that gray whale distribution and habitat use will not change compared to the No-action Alternative.

4.4.3.2.4 Manner and Time to Death

As discussed in Section 4.1, Introduction, the number of gray whales that might be harvested from the ENP stock under all alternatives, including Alternative 2 and the No-action Alternative, would not change. It would remain at the existing IWC catch limit of 620 whales in a five-year period, and no more than 140 whales in any one year. The difference is that under the No-action Alternative, the entire catch could be taken by Chukotka Natives, while under Alternative 2, the Makah Tribe could take up to 20 of the 620 catch limit.

Whales killed with a rifle in a Makah hunt under Alternative 2 could experience a shorter time to death than whales killed with a rifle in a Chukotka Native hunt because of the requirements proposed by the Makah (such as minimum visibility) and because the Makah would use a higher caliber killing weapon than the Chukotka Natives use. Whales killed with an explosive grenade in either hunt would likely experience a similar time to death, thus Alternative 2 would probably not represent a difference in manner and time to death from the No-action Alternative. Thus compared to the No-action Alternative, Alternative 2 could result in the same or lesser time to death, depending on the weapon used.

The proportion of whales struck and lost could be greater in a Makah hunt under Alternative 2 than a Chukotka Native hunt under the No-action Alternative because the Chukotka Natives have more recent hunting experience. The Chukotka Natives report that 4 percent of the whales struck in their hunt are lost. It is not possible to predict a proportion of whales that would be struck and lost in a Makah hunt under Alternative 2, but the Tribe's proposal includes a potential of three whales struck and lost for four whales harvested before the seven-strike limit would be reached. The proportion of whales struck and lost under Alternative 2 could also be greater than the proportion in a Chukotka Native hunt because seasonal restrictions on the Makah hunt under Alternative 2 could result in hunts occurring in rough weather and sea conditions. Hunting under unfavorable conditions could reduce the accuracy of the hunters and make it more difficult to successfully land a killed whale (thus increasing the proportion of whales struck and lost).

4.4.3.3 Alternative 3

Under Alternative 3, whale hunting may occur year round in the coastal portion of the Makah U&A. An average of four whales per year could be harvested, seven whales could be struck, and three struck and lost. During any five-year period, up to 20 whales might be harvested, with 35 struck and 15 struck and lost. Whales that are struck are considered killed. As many as 140 whales may be approached by whale-hunting vessels in any one year and up to 28 whales may be subjected to harpoon attempts. Hunting could potentially occur on a total of 40 days. With seven strikes allowed, the analysis assumes there could be a maximum of 28 rifle shots fired or 21 grenade explosions. Given the opportunity to hunt year round, it is likely the Tribe would be able to harvest the full number of whales allowed.

4.4.3.3.1 <u>Change in Abundance and Viability of ENP Gray Whales</u>

Under Alternative 3, as with all of the alternatives, including the No-action Alternative, the same number of whales would likely be harvested – 620 over five years and no more than 140 in any single year. The potential effects on the abundance of the ENP gray whale stock would likewise be the same – an average annual reduction of 124 whales per year. The potential effect on viability of the ENP gray whale stock would be negligible because the mortality level would not approach PBR, as discussed above under the No-action Alternative and Alternative 2. Alternative 3 would not change the risk to the abundance and viability of the ENP gray whale stock compared to the No-action Alternative.

4.4.3.3.2 <u>Change in Abundance of Gray Whales Using the Makah U&A and ORSVI Survey Areas</u>

Under Alternative 3 there could be an increased risk to abundance of gray whales using the Makah U&A and ORSVI survey areas, compared to the No-action Alternative. Under this alternative, there would be no limit on the hunting season or the number of identified whales that could be harvested. All of the hunting could occur during the summer period (June 1 through

November 30), when any whale present in the Makah U&A would, by definition, be a Makah U&A and ORSVI whale. It is not possible to predict the likely number of identified whales that would be killed under this Alternative without knowing when tribal members would hunt. Of the seven whales that could be killed per year under this Alternative, all seven could be Makah U&A and ORSVI whales.

If seven Makah U&A/ORSVI whales were killed under Alternative 3, it is uncertain whether other whales would take their place during the year in which they were killed. Seven whales are more than the observed annual recruitment to the Makah U&A. So it is possible that there would be a decrease in abundance under this alternative compared to the No-action Alternative. Whales identified in the PCFA survey area could take the place of whales removed from the ORSVI, and whales identified in the ORSVI survey area could take the place of whales removed from the Makah U&A (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Gray whales feeding in the southern portion of the summer range move great distances within a year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use), thus it is reasonable to expect that some removed whales could be replaced in the year in which they were removed. It is also uncertain how quickly Makah U&A/ORSVI whales removed under Alternative 3 would be replaced in subsequent years. As described in Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, Calambokidis et al. (2004a) propose that whales likely recruit to the Makah U&A or other parts of the PCFA survey area from the migratory population randomly, as feeding habitat becomes available along the migration route. Thus it appears likely that at least some of the removed whales could be replaced in subsequent years. Under Alternative 3, the Tribe's harvest would not be adjusted based on abundance of ORSVI whales, although presumably if whales were not available to harvest the Tribe's harvest level would potentially decrease as a practical matter.

Compared to the No-action Alternative, in which no Makah U&A or ORSVI whales are likely to be killed by hunting, Alternative 3 represents an increase in risk to the abundance of gray whales using the Makah U&A and ORSVI survey areas during the summer period. Although the precise number of Makah U&A and ORSVI whales removed cannot be predicted, as many as seven could be killed each year. Given the numbers of whales available to replace them, it is unlikely all seven would be replaced during the year in which they were removed. It is uncertain whether seven would be replaced in the subsequent year. Compared to Alternative 2, Alternative 3 represents a potential seven-fold increase in the risk to abundance of whales in the Makah U&A and ORSVI survey areas, because of the potential for seven of these whales to be killed per year compared to about one whale per year under Alternative 2.

PBR of Whales in the ORSVI

If seven whales from the ORSVI survey area were killed, this would exceed the PBR for whales in the ORSVI survey area proposed by the Makah (potentially seven whales killed compared to the PBR of 2.5 using current abundance estimates). In comparison, under the No-action Alternative there would be no risk of exceeding PBR. Alternative 3 would also result in an increased risk of exceeding PBR, compared to Alternative 2, under which the most likely scenario would result in the death of one ORSVI whale, and the maximum scenario would result in the death of three ORSVI whales.

4.4.3.3.3 <u>Change in Distribution or Habitat Use</u>

There is a risk that implementing Alternative 3 could result in a change in gray whale distribution or habitat use in the coastal portion of the Makah U&A or elsewhere in the PCFA survey area, for the same reasons as described under Alternative 2.

Migrating Whales

Migrating whales travel 1 to 2 miles offshore on their northward migration and may travel further from shore during the southward migration (Section 3.4.3.1.4, Seasonal Migrations). Because hunting under Alternative 3 could occur year round, it could affect both migrating and feeding gray whales. Thus fewer than 140 migrating gray whales would potentially be approached in a year and fewer than 28 would be subjected to unsuccessful harpoon attempts. The number of whales approached would be less than one percent of the total gray whale population of 20,000, while the number exposed to unsuccessful harpoon attempts (28) would be an even smaller fraction. Thus while there is a potential for implementation of Alternative 3 to result in migrating gray whales changing their distribution or habitat use, the risk is likely small, suggesting that gray whale distribution and habitat use will not change compared to the No-action Alternative..

Feeding Whales

Hunting under Alternative 3 could occur year round and much of it would potentially take place during the period from May through September. During the period from June 1 through November 30, any gray whale found in the Makah U&A would, by definition, be a Makah U&A whale, and, by extension, a PCFA whale. As described previously, between seven and 31 whales have been identified in the coastal portion of the Makah U&A in a single year, and between 129 and 206 have been identified in the PCFA in a single year. While the actual number of whales in the Makah U&A is likely larger, it is probably not larger than the number of whales in the larger ORSVI. With the potential for 140 approaches and 28 unsuccessful harpoon attempts over 40 days, it is mathematically possible that every Makah U&A whale could be approached by tribal hunting vessels on multiple occasions, and that every Makah U&A whale could be subject to harpoon attempts. For PCFA whales, the number of whales present in any year is also likely larger than the number observed, although the actual number is unknown.

It is reasonable to expect that approaches by Makah whale-hunting canoes would cause a disturbance similar to or less than that observed from approaches of motorized whale-watching vessels. Thus whale response to approaches is likely to be temporary (minutes or hours). It is less certain what effect an unsuccessful harpoon attempt would have. It is uncertain whether the intensity of unsuccessful harpoon attempts would result in more than a temporary disturbance of Makah U&A whales and cause them to avoid portions of the Makah U&A either for a short period (days to weeks), or a longer period (for example, over a period of years). It is also uncertain whether such disturbance in the Makah U&A would cause PCFA whales to change their distribution or habitat use in the larger PCFA survey area. As described in Section 4.4.2.3, Change in Distribution or Habitat Use, availability of prey may be the factor most strongly affecting gray whale distribution during feeding. If prey is available in the Makah U&A or PCFA, hunting by the Makah Tribe might not result in either a short- or long-term response from summer-feeding whales. Many new whales are seen in the Makah U&A every year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Thus even if some whales do abandon the area as a result of hunting disturbance, new whales that had not previously been exposed to hunting might come into the area, suggesting that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Compared to Alternative 2, Alternative 3 has a greater potential for resulting in a change in distribution or habitat use of feeding gray whales in the coastal portion of the Makah U&A and PCFA survey areas. The opportunity for year-round hunting under Alternative 3 means that all whales subject to approaches or unsuccessful harpoon attempts could be summer-feeding whales, representing a much larger proportion of Makah U&A and PCFA whales than would be the case under Alternative 2. In addition, the potential time in which feeding whales are exposed to hunting is much greater under Alternative 3.

4.4.3.3.4 <u>Manner and Time to Death</u>

As discussed in Section 4.1, Introduction, the number of gray whales that might be harvested from the ENP stock under all alternatives, including Alternative 3 and the No-action Alternative, would not change. It would remain at the existing IWC catch limit of 620 whales in a five-year period, and no more than 140 whales in any one year. The difference is that under the No-action Alternative, the entire catch could be taken by Chukotka Natives, while under Alternative 3, the Makah Tribe could take up to 20 of the 620 catch limit.

Whales killed with a rifle in a Makah hunt under Alternative 3 could experience a shorter time to death than whales killed with a rifle in a Chukotka Native hunt under the No-action Alternative because of the requirements proposed by the Makah (such as minimum visibility) and because the Makah would use a higher caliber killing weapon than the Chukotka Natives use. Whales killed with an explosive grenade in either hunt would likely experience a similar time to death, thus Alternative 3 would probably not represent a difference in manner and time to death from the No-action Alternative. Thus compared to the No-action Alternative, Alternative 3 could result in the same or lesser time to death, depending on the weapon used.

The proportion of whales struck and lost could be greater in a Makah hunt under Alternative 3 than a Chukotka Native hunt under the No-action Alternative because the Chukotka Natives have more recent hunting experience. The Chukotka Natives report that 4 percent of the whales struck in their hunt are lost. It is not possible to predict a proportion of whales that would be struck and lost in a Makah hunt under Alternative 3, but the Tribe's proposal includes a potential of three whales struck and lost for four whales harvested before the seven-strike limit would be reached.

Compared to Alternative 2, under Alternative 3 it would be more likely that the Makah could take the total number of whales allowed because of the year-round season and the lack of limitations on identified whales. Implementation of Alternative 3 could also result in shorter times to death and fewer whales struck and lost than under Alternative 3. The ability to hunt in better weather and sea conditions than under Alternative 2 would likely improve the accuracy of the Makah harpooner and rifleman, increasing the chances that a projectile would hit its intended target and that a struck whale could be harvested.

4.4.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2 and would impose the same restrictions on the hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not affect the likely number of hunting expeditions, patterns of vessel traffic, or the number of whales potentially struck, harvested, or struck and lost. The potential effects to gray whale abundance, viability, distribution, and habitat use under this alternative would therefore likely be similar to that expected under Alternative 2. The methods of striking and killing and the time to death under Alternative 4 would not differ from those anticipated under Alternative 2. The comparison between Alternative 4 and the No-action Alternative would be similar to the comparison between Alternative 2 and the No-action Alternative.

4.4.3.5 Alternative 5

Alternative 5 limits the number of whales that may be struck, harvested and struck and lost in any one year to three, two and one, respectively. There would be no limit on the harvest of PCFA whales. Year-round hunting would be allowed, making it likely that the full number of whales would be harvested. The expected number of hunting days would be 20 per year. Each year an estimated 60 whales would be approached by Makah whale-hunting vessels and an estimated 12 whales would be subjected to unsuccessful harpoon attempts.

4.4.3.5.1 Change in Abundance and Viability of ENP Gray Whales

Under Alternative 5, as with all of the alternatives, including the No-action Alternative, the same number of whales would likely be harvested – 620 over five years and no more than 140 in any single year. The potential effects on the abundance of the ENP gray whale stock would likewise be the same – an average annual reduction of 124 whales per year. The potential effect on viability of the ENP gray whale stock would be negligible because the mortality level would not approach PBR, as discussed above under the No-action Alternative. Alternative 5 would not change the risk to the abundance and viability of the ENP gray whale stock compared to the No-action Alternative.

4.4.3.5.2 Change in Abundance of Gray Whales Using the Makah U&A and ORSVI Survey Areas

Under Alternative 5 there could be an increased risk to abundance of gray whales using the Makah U&A and ORSVI survey areas, compared to the No-action Alternative. Under this alternative, there would be no limit on the hunting season or the number of identified whales that could be harvested. All of the hunting could occur during the summer period (June 1 through November 30), when any whale present in the Makah U&A would, by definition, be a Makah U&A and ORSVI whale. It is not possible to predict the likely number of identified whales that would be killed under this Alternative without knowing when tribal members would hunt. Of the three whales that could be killed per year under this Alternative, all three could be Makah U&A and ORSVI whales.

If three Makah U&A and ORSVI whales were killed under Alternative 5, it is uncertain whether other whales would take their place during the year in which they were killed. Whales identified in the PCFA survey area could take the place of whales removed from the ORSVI, and whales identified in the ORSVI survey area could take the place of whales removed from the Makah U&A. Gray whales feeding in the southern portion of the summer range move great distances within a year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use), thus it is reasonable to expect that some removed whales could be replaced in the year in which they were removed.

It is also uncertain how quickly Makah U&A and ORSVI whales removed under Alternative 5 would be replaced in subsequent years. All three whales killed under this scenario could be Makah U&A whales, which is higher than the average annual recruitment of 4.66 whales described under Alternative 2. As described in Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, Calambokidis et al. (2004a) propose that whales likely recruit to the Makah U&A or other parts of the PCFA survey area from the migratory population randomly, as feeding habitat becomes available along the migration route. Thus it appears likely that at least some of the removed whales could be replaced in subsequent years. Under Alternative 5, the Tribe's harvest would not be adjusted based on abundance of ORSVI whales, although presumably if whales were not available to harvest, the Tribe's harvest level would potentially decrease as a practical matter.

Compared to the No-action Alternative, in which no Makah U&A or ORSVI whales are likely to be killed by hunting, Alternative 5 represents an increase in risk to the abundance of gray whales using the Makah U&A and ORSVI survey areas during the summer period. Although the precise number of Makah U&A and ORSVI whales removed cannot be predicted, as many as three could be killed each year. It is uncertain whether all three would be replaced during the year in which they were removed, or in the subsequent year.

Compared to Alternatives 2 and 4, Alternative 5 represents a potential three-fold increase in the risk to abundance of whales in the Makah U&A and ORSVI survey areas, because of the potential for three of these whales to be killed per year compared to about one whale per year under Alternatives 2 and 4. Compared to Alternative 3, Alternative 5 represents a lower risk because the maximum number of Makah U&A and ORSVI whales that could be removed would be smaller (three compared to seven).

PBR of Whales in the ORSVI

If three whales from the ORSVI survey area were killed, it would slightly exceed the PBR for whales in the ORSVI survey area proposed by the Makah (potentially three whales killed compared to the PBR of 2.5 using current abundance estimates). In comparison, under the No-action Alternative there would be no risk of exceeding PBR. Alternative 5 could also result in an increased risk of exceeding PBR compared to Alternatives 2 and 4. The likely scenario under Alternatives 2 and 4 is that one ORSVI whale would be killed, while the maximum scenario is that three Makah ORSVI whales would be killed. Compared to Alternative 3, Alternative 5 would have a lower risk of exceeding PBR because the potential number of ORSVI whales killed would be smaller (three versus seven).

4.4.3.5.3 Change in Distribution or Habitat Use

There is a risk that implementing Alternative 5 could result in a change in gray whale distribution or habitat use in the coastal portion of the Makah U&A or elsewhere in the PCFA survey area, for the same reasons as described under Alternative 2.

Migrating Whales

Migrating whales travel 1 to 2 miles offshore on their northward migration and may travel further from shore during the southward migration (Section 3.4.3.1.4, Seasonal Migrations). Because hunting under Alternative 3 could occur year round, it could affect both migrating and feeding gray whales. Thus fewer than 60 migrating gray whales would potentially be approached in a year and fewer than 12 would be subjected to unsuccessful harpoon attempts. The number of whales approached would be less than one percent of the total gray whale population of 20,000, while the number exposed to unsuccessful harpoon attempts (12) would be an even smaller fraction. Thus while there is a potential for implementation of Alternative 5 to result in migrating gray whales changing their distribution or habitat use, the risk is likely small, suggesting that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Feeding Whales

Hunting under Alternative 5 could occur year round and much of it would potentially take place during the period from May through September. During the period from June 1 through November 30, any gray whale found in the Makah U&A would, by definition, be a Makah U&A whale, and, by extension, a PCFA whale. As described previously, between seven and 31 whales have been identified in the Makah U&A in a single year, and between 129 and 206 have been identified in the PCFA in a single year. While the actual number of whales in the Makah U&A is likely larger, it is probably not larger than the number of whales in the larger ORSVI. With the potential for 60 approaches and 12 unsuccessful harpoon attempts over 40 days, it is mathematically possible that every Makah U&A whale could be approached by tribal hunting vessels on multiple occasions, and that a substantial proportion of Makah U&A whales could be subjected to harpoon attempts. For PCFA whales, the number of whales present in any year is also likely larger than the number observed, although the actual number is unknown.

It is reasonable to expect that approaches by Makah whale-hunting canoes would cause a disturbance similar to or less than that observed from approaches of motorized whale-watching vessels. Thus whale response to approaches is likely to be temporary (minutes or hours). It is less certain what effect an unsuccessful harpoon attempt would have. It is uncertain whether the intensity of unsuccessful harpoon attempts would result in more than a temporary disturbance of Makah U&A whales and cause them to avoid portions of the Makah U&A either for a short period (days to weeks), or a longer period (for example, over a period of years). It is also uncertain whether such disturbance in the Makah U&A would cause PCFA whales to change their distribution or habitat use in the larger PCFA survey area. As described in Section 4.4.2.3, Change in Distribution or Habitat Use, availability of prey may be the factor most strongly affecting gray whale distribution during feeding. If prey is available in the Makah U&A or PCFA, hunting by the Makah Tribe might not result in either a short- or long-term response from summer-feeding whales. Many new whales are seen in the Makah U&A every year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Thus even if some whales do abandon the area as a result of hunting disturbance, new whales that had not previously been exposed to hunting might come into the area, indicating that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Compared to Alternatives 2 and 4, Alternative 5 has a greater potential for resulting in a change in distribution or habitat use of feeding gray whales in the Makah U&A and PCFA survey areas. The opportunity for year-round hunting under Alternative 5 means that all whales subject to approaches or unsuccessful harpoon attempts could be summer-feeding whales, representing a larger proportion of Makah U&A and PCFA whales than would be the case under Alternatives 2 and 4. Compared to Alternative 3, Alternative 5 has a lower potential for resulting in a change in distribution or habitat use of feeding gray whales in the Makah U&A and PCFA survey areas. Although both alternatives allow year-round hunting and could result in most hunting occurring during the summer period, fewer whales would be approached or subjected to unsuccessful harpoon attempts.

4.4.3.5.4 Manner and Time to Death

Alternative 5 would have the same effects regarding manner and time to death for gray whales as described under Alternatives 2, 3, and 4, except that the total number of whales killed in a Makah hunt would be 10 rather than 20. Hunting efficiency could be one whale struck and lost for two whales harvested and so would be about the same as under Alternatives 2, 3, and 4, as compared to the No-action Alternative.

4.4.3.6 Alternative 6

Under Alternative 6, whale hunting may occur year round in both the coastal and Strait of Juan de Fuca portions of the Makah U&A. An average of four whales per year could be harvested, seven whales could be struck, and three struck and lost. During any five-year period, up to 20 whales might be harvested, with 35 struck and 15 struck and lost. Whales that are struck are considered killed. As many as 140 whales may be approached by whale-hunting vessels in any one year and up to 28 whales may be subjected to harpoon attempts. Hunting could potentially occur on a total of 40 days. Given the opportunity to hunt year round, it is likely the Tribe would be able to harvest the full number of whales allowed.

4.4.3.6.1 Change in Abundance and Viability of ENP Gray Whales

Under Alternative 6, as with all of the alternatives, including the No-action Alternative, the same number of whales would likely be harvested – 620 over five years and no more than 140 in any single year. The potential effects on the abundance of the ENP gray whale stock would likewise be the same – an average annual reduction of 124 whales per year. The potential effect on viability of the ENP gray whale stock would be negligible because the mortality level would not approach PBR, as discussed above under the No-action Alternative. Alternative 6 would not change the risk to the abundance and viability of the ENP gray whale stock compared to the No-action Alternative.

4.4.3.6.2 Change in Abundance of Gray Whales Using the Makah U&A and ORSVI Survey Areas

Under Alternative 6 there could be an increased risk to abundance of gray whales using the Makah U&A and ORSVI survey areas, compared to the No-action Alternative. This increase would be the same as that described under Alternative 3, for the reasons described in Section 4.4.2.2, Change in Abundance of Gray Whales Using the Makah U&A or ORSVI Survey Areas.

4.4.3.6.3 Change in Distribution or Habitat Use

There is a risk that implementing Alternative 6 could result in a change in gray whale distribution or habitat use in the overall Makah U&A or elsewhere in the PCFA survey area, for the same reasons as described under Alternative 2.

Migrating Whales

Migrating whales travel 1 to 2 miles offshore on their northward migration and may travel further from shore during the southward migration (Section 3.4.3.1.4, Seasonal Migrations). Because hunting under Alternative 3 could occur year round, it could affect both migrating and feeding gray whales. Thus fewer than 140 migrating gray whales would potentially be approached in a year and fewer than 28 would be subjected to unsuccessful harpoon attempts. The number of whales approached would be less than one percent of the total gray whale population of 20,000, while the number exposed to unsuccessful harpoon attempts (28) would be an even smaller fraction. Thus while there is a potential for implementation of Alternative 6 to result in migrating gray whales changing their distribution or habitat use, the risk is likely small, indicating that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Feeding Whales

Hunting under Alternative 6 could occur year round and much of it would potentially take place during the period from May through September. Hunting would also likely occur in the Strait of Juan de Fuca portion of the Makah U&A. During the period from June 1 through November 30, any gray whale found in the Makah U&A would, by definition, be a Makah U&A whale, and, by extension, a PCFA whale. As described in Section 3.4.3.3.1, Summer Range Distribution and Habitat Use, between 8 and 35 whales have been identified in the overall Makah U&A in a single year, and between 129 and 206 have been identified in the PCFA in a single year. While the actual number of whales in the Makah U&A is likely larger, it is probably not larger than the number of whales in the larger ORSVI. With the potential for 140 approaches and 28 unsuccessful harpoon attempts over 40 days, it is mathematically possible that every Makah U&A whale could be approached by tribal hunting vessels on multiple occasions, and that every Makah U&A whale could be subject to harpoon attempts. For PCFA whales, the number of whales present in any year is also likely larger than the number observed, although the actual number is unknown.

It is reasonable to expect that approaches by Makah whale-hunting canoes would cause a disturbance similar to or less than that observed from approaches of motorized whale-watching vessels. Thus whale response to approaches is likely to be temporary (minutes or hours). It is less certain what effect an unsuccessful harpoon attempt would have. It is uncertain whether the intensity of unsuccessful harpoon attempts would result in more than a temporary disturbance of Makah U&A whales and cause them to avoid portions of the Makah U&A either for a short period (days to weeks), or a longer period (for example, over a period of years). It is also uncertain whether such disturbance in the Makah U&A would cause PCFA whales to change their distribution or habitat use in the larger PCFA survey area. As described in Section 4.4.2.3, Change in Distribution or Habitat Use, availability of prey may be the factor most strongly affecting gray whale distribution during feeding. If prey is available in the Makah U&A or PCFA, hunting by the Makah Tribe might not result in either a short- or long-term response from summer-feeding whales. Many new whales are seen in the Makah U&A every year (Section 3.4.3.3.1, Summer Range Distribution and Habitat Use). Thus even if some whales do abandon the area as a result of hunting disturbance, new whales that had not previously been exposed to hunting might come into the area, suggesting that gray whale distribution and habitat use will not change compared to the No-action Alternative.

Compared to all other action alternatives, the opportunity to hunt in the Strait of Juan de Fuca portion of the Makah U&A under Alternative 6 means that a change in gray whale distribution could occur in the strait as well as in the coastal portion of the Makah U&A.

Compared to Alternatives 2 and 4, Alternative 6 has a greater potential for resulting in a change in distribution or habitat use of feeding gray whales in the Makah U&A and PCFA survey areas. The opportunity for year-round hunting under Alternative 6 means that all whales subject to approaches or unsuccessful harpoon attempts could be summer-feeding whales, representing a much larger proportion of Makah U&A and PCFA whales than would be the case under Alternatives 2 and 4.

Compared to Alternative 3, Alternative 6 would have similar effects, except that the opportunity to hunt in the Strait of Juan de Fuca portion of the Makah U&A means that a change in gray whale distribution could occur in that area as well. Compared to Alternative 5, Alternative 6 has a greater potential to result in a change in distribution or habitat use of gray whales because more whales would be subjected to approaches and unsuccessful harpoon attempts.

4.4.3.6.4 Manner and Time to Death

Alternative 6 would have the same effects regarding manner and time to death for gray whales as described under Alternatives 2 through 4. Hunting efficiency could be one whale struck and lost for two whales harvested and so would be about the same as under Alternatives 2 through 4, as compared to the No-action Alternative.

4.5 Other Wildlife

4.5.1 Introduction

This section addresses the potential for the proposed alternatives to affect wildlife species in the project area. Species analyzed in this section include marine mammals (other than gray whales, see Section 4.5), birds, and reptiles (i.e., sea turtles). Analyses in this section address all species identified in Section 3.5, Other Wildlife Species, as occurring in the project area, including those listed as threatened or endangered under the ESA and those not listed. This analysis focuses on wildlife species that may occur in the project area and that have potential to be affected by hunt-related activities. For species that are not likely to occur near proposed hunt activities, no effects are expected.

There are three primary sources of potential effects of whale-hunt-related activities on wildlife considered in this analysis. First are the potential direct effects related to visual and noise disturbance from anticipated concentrations of aircraft and boat traffic and the use of guns and explosives associated with any hunt. Such disturbance may disrupt the behavior of individuals or groups of animals in the project area. Second are the potential indirect effects from visual and noise disturbance that may disrupt prey distribution or abundance, resulting in decreased foraging efficiency. Third is the potential for direct harm to marine mammals (other than gray whales) from increased vessel traffic and hunt-related activities that could cause injury or death if a marine mammal was struck by a vessel or a projectile associated with a hunt. The following sections discuss these issues in greater detail.

4.5.2 Evaluation Criteria

Three evaluation criteria were used to assess the potential direct and indirect effects of the alternatives on other wildlife species in the project area: potential changes in behavior due to disturbance (visual and noise), potential changes in prey availability, and potential for physical injury (e.g., from ship strikes or weapons). These criteria provide a way to analyze the potential effects of the alternatives on wildlife.

The following sections describe the potential for the alternatives to affect wildlife in the project area. For each alternative, the discussion addresses potential disturbance and injury and, where relevant, potential changes in prey availability. For each criterion, potential effects on marine mammals (excluding gray whales) are described first, followed by birds and reptiles (turtles). For each species group, ESA-listed endangered and threatened species are addressed first, followed by those species that are not listed. Non-listed seabirds and other birds that use coastal habitats are analyzed by habitat association, described under Section 3.5.3.2.2, Non-listed Birds and Their Associated Habitats. That section reviews the habitat associations and discusses which species of birds are included in each zone. To reduce repetition, species that would probably be affected similarly under a particular evaluation criterion are addressed together.

4.5.2.1 Disturbance

Section 4.11, Noise, describes the sources and level of noise-related disturbance that may occur during a hunt. Section 3.5.3.3, Sensitivity of Wildlife to Noise and Other Disturbance, describes how wildlife typically respond to these types and sources of noise. Many activities associated with a whale hunt have the potential to generate noise levels that would exceed ambient levels in parts of the project area (Section 4.11.2.1, Noise Generated by Hunt-related Activities). Under current conditions, noise from vehicles, marine vessels, and aircraft is commonly heard throughout the Makah U&A. Other sources of noise include commercial areas, sports fields, logging operations, and the foghorn at Tatoosh Island. Natural sounds, such as those of wind and surf, contribute to high ambient noise levels in portions of the project area, particularly in areas close to the shoreline of the Pacific coast and the Strait of Juan de Fuca. A whale hunt and associated monitoring, protests, and law enforcement would be expected to result in increased noise and human activity levels. In addition, firearms and other explosive devices used to strike and kill a whale would produce high-intensity, short-duration noise.

Sources of noise and visual disturbance associated with whale hunt activities include aircraft overflights (both fixed wing and helicopter), boat traffic (including both motorized and non-motorized craft), gunfire, and explosives. Anthropogenic noise can be either transient or continuous and can result in a variety of effects on wildlife with consequences ranging from none to severe (Würsig and Richardson 2002). Examples of transient noise associated with whale-hunting under the action alternatives would include helicopters, planes, and explosions; examples of continuous noise include vessels underway.

Among the proposed alternatives, the No-action Alternative would pose the lowest risk of disturbance to other species of wildlife. Under all of the action alternatives, the greatest potential for direct effects on other wildlife species would be from noise and visual disturbance related to increased human activity directly and indirectly associated with a whale hunt. This analysis considers the likelihood of effects on wildlife due to such increased disturbance.

Analyses in this section consider the nature and magnitude of hunt-related activities in relation to wildlife occurrence and behavior (e.g., nesting, migration, foraging, nursing, and other critical survival activities). For each species, species group, or habitat type, the analysis examines the proximity of hunt-related activities to sensitive areas (e.g., rookeries, nest sites, haulout sites). Alterations in wildlife behavior may occur if vessels, or aircraft associated with hunt-related activities travel through locations close enough to sensitive areas to disturb animals (Section 3.5.3.3.2, Boat Traffic, and Section 3.4.3.6.6, Vessel Interactions).

It is possible that the number and types of vessels and aircraft that would participate in each hunting expedition (including observation, protests, law enforcement, and media coverage) would vary among the action alternatives. For example, alternatives that allow year-round hunting could result in a greater number of observers overall because of an increased likelihood of more hunting occurring during periods of good weather. Conversely, alternatives that allow more hunts might attract less public interest over time and less media coverage. Because of the difficulty of predicting such variations, and how they might affect the precise numbers of vessels and aircraft participating in each hunt, this analysis assumes each hunting expedition would be accompanied by the same amount of vessel and aircraft activity and associated disturbance. Vessels and aircraft associated with each hunt would likely be similar to those associated with the previous hunts, described in Section 3.11.3.2.1, Atmospheric Noise. It is not possible to predict the specific location of hunt-related activity on a given day under any action alternative. The area in which hunting would be allowed would be the same among the action alternatives with two exceptions: (1) under Alternative 4, hunting would not be allowed within 200 yards of rocks and islands in the project area, and (2) under Alternative 6, hunting could also occur in the Strait of Juan de Fuca.

4.5.2.1.1 Marine Mammals (excluding Gray Whales)

As described in detail in Section 3.5.3.3, Sensitivity of Wildlife to Noise and Other Disturbance, marine mammals in the coastal environment (e.g., seals, sea lions, and sea otters) may react to changes in noise and human presence by altering behaviors such as breeding, nursing, grooming, foraging, or resting. The effects of such disturbance on marine mammals would be related primarily to the type, level, timing, and location of disturbance relative to species locations and activity. Animals might be disturbed at haulout sites and spend more time in the water, thereby reducing rest periods, altering nursing frequency, and modifying thermoregulation. Species that breed in the project area (i.e., harbor seals and sea otters) could be disturbed during the summer, when hunt activities might disrupt pupping or breeding activities or interrupt the female/pup bond during nursing.

Whales, dolphins, and porpoises might react to increased disturbance related to a hunt by changing their swim speed or direction or increasing dive duration. The sight and sound of vessels might also disturb the foraging behavior of seals and sea lions in the water and may affect foraging and grooming behaviors of sea otters. Noise from vessels, aircraft, and weapons associated with whale hunting might disrupt the ability of predatory species (e.g., killer whales) to communicate and to locate or obtain prey. For all of these species of marine mammals, any resultant effects would likely be temporary (lasting a few minutes to a few hours) and localized (occurring near the hunt).

Section 4.11.2.1, Noise Generated by Hunt-related Activities, discusses the level and duration of noise anticipated from weapon use and vessel and aircraft activity associated with hunting. It is not possible to predict in advance the exact level of atmospheric or underwater noise that vessels and aircraft would produce on a typical day of hunting. Depending on the method used to kill a struck whale, the loudest noise levels associated with hunting would be from gunshots (atmospheric noise) or grenade explosions (underwater noise) (Section 4.11.2.1, Noise Generated by Hunt-related Activities). Noise from a gunshot would probably decay to ambient levels within 1 or 2 miles of the source (although this distance cannot be determined with certainty), while a grenade explosion underwater might not decay to ambient levels for several miles. Noise from these sources would last only a few seconds.

Overall, the number of marine mammals that would potentially occur close enough to hunting activities to be affected by the associated noise would probably be low. As presented in Table 3-11, frequency of occurrence of about half of the federal- and state-listed species of marine mammals in the project area is uncommon or rare. Nearly all of the species of marine mammals that may occur in the project area, including ESA-listed species, are wide-ranging and may travel long distances as part of their normal daily movements. Sea otters do not typically travel long distances on a daily basis but are known to travel extensively in the vicinity of the Makah U&A (Lance et al. 2004). Thus, any changes in behavior of these species due to disturbance from whale hunt-related activities would likely be temporary and would probably not have lasting effects on individuals or populations. Noise effects specific to particular species and species groups of wildlife are discussed below.

ESA-listed Marine Mammals

Several ESA-listed species of wildlife are known to occur in the project area but would probably not be affected by the proposed whale-hunt-related activities because of their rare to uncommon occurrence along the Washington coast and/or their use of habitats too far from shore to encounter any hunt-related activities in the project area (Table 3-11). These species include five ESA-listed species of whales (sperm, blue, sei, fin, and right) and one ESA-listed pinniped (Steller sea lion). When present in Washington waters, all of the whale species typically occur in pelagic deep waters offshore in the Makah U&A beyond the bounds of where proposed hunting would likely occur. There may be brief periods during hunt-related activities, particularly as a result of aircraft activities or grenade explosions, when ESA-listed marine mammals would be exposed to increased noise levels and might modify their behavior (dive duration, swim direction, etc.) in response. Although ESA-listed species of marine mammals have a low likelihood of encountering hunt-related activities, the species that would have the highest likelihood of encountering hunt-related activities include the Steller sea lion, killer whale, and humpback whale. These species are discussed in further detail below.

As mentioned above, all species of marine mammals that may occur in the project area, including ESA-listed species, are wide-ranging and may travel long distances as part of their normal daily movements. Any changes in behavior of these species due to whale hunt-related disturbance would likely be temporary and would probably not have lasting effects.

Steller Sea Lion

Steller sea lions are common in and near the project area throughout the year and are most abundant in late summer, fall, and winter. They use offshore islands and rocks for resting and to nurse pups. Most offshore islands and rocks in the project area are less than 1 mile from the shoreline, whereas most hunting under the action alternatives would probably take place 1 mile or more offshore (as was the case with previous hunts). It is unlikely that any whale hunt activities would occur close to haulout sites for Steller sea lions, although the noise associated with helicopters and gunshots, especially, would carry much farther than the immediate hunt area. Steller sea lions also forage in waters within the Makah U&A. Disturbance associated with the use of vessels associated with a hunt might occasionally disrupt foraging behavior of Steller sea lions in the project area. As with other species of marine mammals that may occur in the project area, Steller sea lions are wide-ranging and may travel long distances as part of their normal daily movements. Any changes in behavior due to whale-hunt-related disturbance would likely be localized and temporary and would probably not have lasting effects.

Killer Whale

Offshore, transient, and southern resident killer whales might occur in or near the project area year round. Of these, southern residents are the most likely to occur in the project area and may be present at any time of year (Section 3.5.3.1.1, ESA-Listed Marine Mammal Species). Transient whales may also be present sporadically. The greatest number of southern resident killer whales have been sighted in the summer in inland waters east of the Makah U&A. Very little information is available about the movements of southern resident killer whales off the Washington coast. It is unclear whether these whales spend a substantial amount of their time in the Strait of Juan de Fuca (71 FR 69054, November 29, 2006). Nonetheless, the potential exists for killer whales to be in the vicinity of a whale hunt and thus disturbed by the associated activities under any of the action alternatives.

As with other species of marine mammals, noise and human activity related to the use of vessels associated with whale hunting might cause killer whales to modify their behavior. As discussed in 3.5.3.3.1, ESA-listed Marine Mammal Species, listing factors for the killer whale included, among other things, noise and disturbance from vessel traffic. Killer whales may temporarily change dive duration or swim direction, for example, in response to hunt-related disturbance, particularly disturbance associated with the use of aircraft. Disturbance from vessels, aircraft, and weapons associated with whale hunting also has the potential to disrupt the ability of killer whales to communicate or find prey. As with other species of marine mammals that may occur in the project area, killer whales are wide-ranging and may travel long distances as part of their normal daily movements. Any changes in behavior of these species due to whale hunt-related disturbance would likely be localized and temporary and would probably not have lasting effects.

As discussed in 3.5.3.3.1, ESA-listed Marine Mammal Species, the primary constituent elements for the southern resident killer whale critical habitat include (1) water quality to support growth and development; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging. None of the proposed alternatives would appreciably affect these elements of critical habitat for this species.

Humpback Whale

Humpback whales occur occasionally in or near the project area and might occur in the vicinity of a whale hunt. Noise and visual disturbance from vessels, aircraft, or weapons could thus affect humpback whales above or below the water. Potential effects would include changed swim speed or direction or increased dive duration to avoid the noise.

As mentioned above, all species of marine mammals that may occur in the project area, including humpback whales, are wide-ranging and may travel long distances as part of their normal daily movements. Thus, any changes in behavior (migration, movements, and habitat use) of these species due to whale-hunt-related activities would likely be temporary and would probably not have lasting effects.

Non-ESA-listed Cetaceans

Of the 15 non-listed species of cetaceans discussed in Section 3.5.3.1, Marine Mammals, 12 are rare or uncommon off the Washington coast and/or use habitats in the pelagic environment, far from the vicinity of whale-hunting activities in the project area (Table 3-11). Thus these 12 species would probably not be affected by whale-hunt-related activities and are not considered further in this analysis. These 12 species include northern right whale dolphin, common dolphin, striped dolphin, Risso's dolphin, false killer whale, pilot whale, pygmy sperm whale, minke whale, Baird's beaked whale, curvier beaked whale, Hubb's beaked whale, and Stejneger's beaked whale. The three exceptions are harbor porpoise, which occur in the coastal environment, and Dall's porpoise and Pacific white-sided dolphins, which are infrequent visitors there. When any of these three species are present in coastal areas during a hunt, they would probably be affected by disturbance from vessels, aircraft, or weapons associated with a whale hunt. Whales, dolphins, and porpoises might react to hunt-related disturbance by changing their swim speed or direction or increasing dive duration. Noise from vessels, aircraft, and weapons associated with whale hunting might disrupt the ability of predatory species (e.g., killer whales) to communicate and to locate or obtain prey.

As mentioned above, all species of marine mammals that may occur in the project area, including the non-ESA-listed species of cetaceans, are wide-ranging and may travel long distances as part of their normal daily movements. Any changes in behavior of these species due to whale hunt-related activities would likely be temporary and would probably not have lasting effects.

Non-ESA-listed Pinnipeds

As discussed in Section 3.5.3.1, Marine Mammals, four non-ESA-listed species of pinnipeds are known to occur in the project area: harbor seal, California sea lion, northern elephant seal, and northern fur seal. Of these species, only the California sea lions and harbor seals have a reasonable potential to occur in the vicinity of a hunt in the project area (Section 3.5.3.1.2, Common Species off Washington Coast). Northern fur seals and northern elephant seals occur infrequently and in relatively low abundance in the project area, or they occur in the pelagic environment where they would probably not encounter whale hunt-related activities. California sea lions and harbor seals are, however, common in the project area. Similar to Steller sea lions, both species use offshore islands and rocks for resting (California sea lions) or to nurse pups (harbor seals), thus their haulout sites would have a very low likelihood of being affected by hunt-related activities in the project area. California sea lions and harbor seals also forage in waters throughout the Makah U&A. Any potential effects on these species would likely be identical to those described above for Steller sea lions; any changes in behavior of these species due to whale hunt-related disturbance would likely be temporary and localized.

Northern Sea Otter

Northern sea otters are common in the project area throughout the year and can travel extensively or shift their distribution seasonally to forage or seek more sheltered waters (Lance et al. 2004). They generally inhabit shallow coastal waters less than 1 mile from shore, but they may occasionally be seen as far as 3 miles offshore. Disturbance from the use of vessels, aircraft, or weapons associated with whale hunting (as discussed in Section 4.5.2.1.1, Marine Mammals (excluding gray whales)) might affect sea otters that are swimming, foraging, or grooming in or near the project area, by causing them to spend time avoiding the activity and thus reducing foraging, resting, grooming, and breeding activities, including nursing or caring for young.

4.5.2.1.2 <u>Other Marine Wildlife</u>

ESA-Listed Species

Several ESA-listed species of wildlife are known to occur in the project area, including three ESA-listed species of birds (short-tailed albatross, brown pelican, and marbled murrelet) and four species of sea turtles (leatherback, green, loggerhead, and olive ridley). Although the bald eagle was recently delisted, the species is still protected under the Bald and Golden Protection Act, and is thus addressed with the other ESA-listed species below.

Short-tailed Albatross

When present in Washington waters, short-tailed albatrosses typically occur in pelagic, deep waters offshore in the Makah U&A beyond the bounds of where proposed hunting would occur. There may be brief periods during hunt-related activities, particularly as a result of aircraft activities or grenade explosions, when a short-tailed albatross would be exposed to increased noise levels and might modify its behavior in response, but the likelihood of such an encounter would be low.

As is the case for most marine mammals in the project area, short-tailed albatrosses are wide-ranging and may travel long distances as part of their normal daily movements. Any changes in behavior of these species due to whale hunt-related disturbance would likely be temporary and localized.

Brown Pelican

Brown pelicans typically breed outside the region and arrive along the coast of Washington in June, foraging on schools of fish in and near the project area. Disturbance associated with vessel traffic, weapons discharge, or aircraft may inhibit foraging activities of brown pelicans in a particular area. If this occurs, pelicans would most likely move to other food sources nearby without detriment to energy resources, because schools of fish typically are available at numerous points along the coast. It is unknown how far away a hunt could occur without interfering with pelicans' foraging activities. Any negative impacts would probably be temporary and localized. The more often the hunt were conducted during the period pelicans are present, the greater the chance that it would disrupt pelican foraging activities.

Marbled Murrelet

Murrelets either dive or paddle away when approached by a boat, depending on the speed of the boat. If disturbance occurs in a foraging area where murrelets congregate, the birds potentially could lose an opportunity to find a fish. It is unknown how murrelets react to gunfire, helicopters, and other loud disturbances to which these birds are unaccustomed, although helicopters and gunfire would probably cause them to either dive or fly away from the area completely (Nelson 1997). Flushing birds might stress their energy reserves, given that they have to fly long distances to bring fish to their young during the breeding season (April 1 through September 15). The time of day that the disturbance occurred might also make a difference in the degree of impacts on this species. During the breeding season, most foraging takes place during the early morning hours (Nelson 1997).

Whale hunts and associated activities under action alternatives could disturb adult murrelets foraging at sea, potentially reducing the amount of prey brought to chicks. The likelihood of any disturbance is low, however, because hunt-related activities would occupy a small proportion of the project area at any given time. Marbled murrelets would likely be able to find foraging opportunities in areas where no disturbance would occur, although this could be more difficult for birds undergoing a two-month molt (which occurs during the latter half of the year).

Bald Eagle

As mentioned above, although bald eagles were recently removed from the ESA list of threatened species, this analysis includes them in the section on ESA-listed species, to provide them particular consideration. Bald eagles are present in the project area throughout the year and they nest, roost, and forage along the coastline. Bald eagles are known to flush off nests and roost sites when people or vessels get too close, and they may be deterred from foraging in an area where many vessels congregate on the water (Stinson et al. 2001). Bald eagles are more sensitive to disturbance during the spring months when they nest. Flushing off their nests, particularly at the beginning of the breeding season, might cause nest abandonment or a reduction in physical conditions, which could in turn affect the ability to feed chicks. Once chicks hatch in May, there would be less likelihood of nest abandonment.

It is unlikely that any whale hunt activities would occur close to active bald eagle nests, as previous hunts have occurred 1 to 2 miles offshore; however, the noise associated with helicopters and gunshots, especially, would carry much farther than the immediate hunt area. The first few years would potentially result in the greatest risk of negative effects from noise to nesting bald eagles, as over the longer term they might acclimate to the noise and visual disturbance associated with hunt activities. Thus, production of chicks might drop for a few years until the eagles became acclimated.

Helicopters and fixed-wing aircraft and increased human activity associated with hunt-related activities would probably alter the behavior of bald eagles that may be present in the project area during a hunt. Bald eagles flush away from nesting or foraging sites when approached by helicopters as close as 0.4 mile. Flushing distances are greater in the breeding season than in winter. While eagles would flush when helicopters come within 1,000 feet in the winter, they would flush if helicopters would approach to within 1,500 feet when on a nest (Stalmaster and Kaiser 1997). It is likely that some eagles cannot tolerate human presence and its associated noise within a particular distance of their feeding or nesting activities.

Sea Turtles

Four species of sea turtles occasionally occur along the Washington coast: leatherback, green, loggerhead, and olive ridley. Leatherback sea turtles are seldom seen in the project area, but they may migrate along the Washington coast during non-breeding years; thus, they could be found in the project area at any point in time. This species occasionally forages in the deep pelagic waters off the Washington coast. Rarely, leatherbacks appear in bays and estuaries, although such venues are not their preferred habitat. Green, loggerhead, and olive ridley sea turtles are found in warmer waters and only approach the Washington coast in El Niño years. All four of these species of turtles would most likely continue to forage along the Washington coast under the action alternatives, especially during warm winter years. These species of turtles are not easily disturbed during foraging activities; if approached by boats, they would most likely move slowly away from any sources of disturbance. There may be some short-term effects related to temporary disturbance from hunt-related activities that would cause them to move away from a preferred feeding area, but this would probably be temporary. Since none of these species of turtles nests in Washington State, there would be no expected impacts from whale-hunt-related activities on their nests or nesting habitat.

Non-Listed Marine Birds and Their Associated Habitat

The project area includes some of the largest seabird colonies in the continental United States, with more than 100 species of birds using this area for nesting, wintering, or foraging. Analyses in this section focus on the six types of habitat these species use and the effects that the alternatives would have on these habitat types. All six habitat associations (beaches, bays, and estuaries; headlands and islands; nearshore marine habitat; inland marine habitat; marine shelf habitat; and oceanic habitat) are present in the project area and are discussed individually where appropriate.

Beaches, Bays, and Estuaries

The beaches, bays, and estuaries along the Olympic coast support large numbers of marine and shorebirds for both breeding and foraging, particularly during migration. These habitat associations support the highest numbers of species compared with other habitat associations. Disturbance from vessels and aircraft that pass near beaches, bays, and estuaries may have short-term effects on breeding colonies and migrating birds that use these habitat associations. Gunfire and helicopter noise is particularly likely to flush birds off nests if it is close to shore where these birds are nesting or if they are foraging just offshore. Additionally, noise from powerboats that approach the shore could cause birds unaccustomed to this activity temporarily to flush off nests.

If disturbance occurred during the breeding season (generally spring and summer), some nest abandonment might occur. It is difficult to determine what impact this type of direct short-term effect would have on the long-term productivity of populations as a whole, although it might be a negligible loss.

Potential disturbance of individual pairs of nesting birds that happened to be close to a whale butchering site on the shore could cause loss of that year's chicks. Any harvested whale would probably be brought to a beach on the Makah Reservation, so nesting colonies (and migrating aggregations) on the reservation would face the greatest risk of disturbance and displacement under the action alternatives. That risk would be associated primarily with the number of whales harvested.

As mentioned in Section 3.5.3.2.2, Non-listed Birds and Their Associated Habitats, human-made structures, such as jetties, pilings, and buoys, provide important roosting habitat for cormorants, gulls, and other birds. None of the proposed alternatives would alter any existing human-made structures, or result in the construction of new ones, that may be used by these species for roosting.

Coastal Headlands and Islands

Large numbers of ledge-nesting birds inhabit offshore rocks and islands in the project area. Coastal headlands and islands provide critical nesting, foraging, and overwinter migratory habitat for these species. Species of ledge-nesting birds in the project area may be easily flushed off nest sites, leading to abandonment, predation, and subsequent nest failure. In addition, raptors, passerines, and other marine birds also use these habitat associations. Noise associated with hunt activities, should hunting occur close to the headlands and islands, could potentially flush birds off nest sites, similar to the short- and long-term impacts discussed above under Beaches, Bays, and Estuaries. The potential for ledge-nesting species of birds to be affected by whale hunt-related activities in the project area, and the degree of effect, would depend largely on the timing and proximity of any potential hunt-related disturbance. The potential for such disturbance, and impacts to these species, would be greater under alternatives associated with higher numbers of days of hunting and those with hunting potentially occurring during the breeding season. Concerns about disturbance of birds on islands might be reduced under Alternative 4, which is the same as the Makah proposed hunt but restricts hunt-related activity around all rocks and islands.

Nearshore Marine Zone

Birds in the project area use nearshore marine habitats primarily for foraging. A variety of common marine birds also use this area as a migration corridor. Species richness and bird abundance are greatest in winter, although some seabirds may concentrate in large numbers during the summer. Species richness is relatively low in inland marine waters, with richness and bird densities higher in winter than summer. Most species found in this area forage in the winter or during migration.

Nearshore marine habitats are one of the zones where whale hunting could occur under the action alternatives. The nearshore zone occurs mostly within 1 mile of the shoreline. As with the previous hunts, most hunting under the action alternatives would probably take place 1 mile or more offshore. Noise from vessels and aircraft, gunfire, and other hunt-related activities would probably not be as intense as in the continental shelf zone farther offshore. The potential for hunt-related activities to result in disturbance of birds using nearshore marine habitats, therefore, would be relatively low compared to the potential for disturbance in habitats farther offshore. Whale hunting during summer (under Alternatives 3, 5, and 6), however, may target whales that are feeding in the project area, and may therefore take place closer to shore than hunting during winter or spring, which may target migrating whales further offshore (Alternatives 2 and 4).

Vessel noise and human activity associated with hunt activities would displace foraging birds. When a whale is harpooned, all birds foraging within a few hundred feet of the whale hunt would probably flush in response to the sounds of gunfire, helicopters, or other loud devices. Interrupted foraging might lead to increased stress on birds' metabolism, but the short- or long-term effects on the populations as a whole would be difficult to determine. Because bird densities are moderate in these habitat associations, the risk of losing nesting, foraging, and migrating birds would also be at moderate levels, even under current conditions.

Continental Shelf

This zone provides foraging habitat and a migration corridor for a variety of marine birds and turtles, primarily during winter and during late summer/early fall when both residents and migrants abound. Because bird densities are lower in this habitat association, the risk of losing foraging and migrating birds is also lower, compared to other zones closer to shore.

Much of this zone is 1 mile or more offshore, which corresponds with the area where most hunting under the action alternatives would probably take place (as was the case with previous hunts). Because the density of birds in this zone is lower than in areas closer to shore, and because no breeding or roosting occurs in this zone, the risk of disturbance in these habitat associations would be lower than the risk in nearshore zones.

Continental Slope

The continental shelf hosts the lowest species richness among the habitat associations considered in this analysis and is limited to foraging birds or turtles as they migrate, or residents that forage in deep waters. Species associated with this zone are primarily gulls and terns. This area is approximately 9 miles offshore (Buchanan et al. 2001), and fewer bird species use this zone than other habitat associations closer to shore. It is likely that hunt-associated activities would occur closer to shore (within 1 to 2 miles). For these reasons, it is likely that any effects of whale hunting on foraging and migrating birds that use these deep ocean waters would be negligible.

4.5.2.2 Prey Availability

Transient killer whales consume gray whales. The analysis considers the likelihood and significance of reduced abundance or availability of prey for foraging killer whales. Under the action alternatives, the abundance of gray whales in the project area could decrease due to hunting or movement out of the area in response to noise and human presence. Such decreases might reduce abundance or availability of prey for killer whales, causing them to spend more time foraging and increasing the risk of predation or compromised health. The amount of whale hunting activity would indicate the likelihood that this might occur.

Regardless of the amount of whale hunting activity that would likely occur under any of the action alternatives, the loss of potential prey to killer whales due to removal of gray whales is unlikely to have individual or population-level effects on killer whales in the project area. The endangered southern resident killer whales eat fish and do not consume gray whales (or other marine mammals). Gray whales account for only 8 percent of observed predation by transient killer whales on marine mammals on the west coast of North America; calves and juvenile make up the bulk of the gray whales taken. Gray whales are also abundant in the project area. Thus, removal of a maximum of seven adult gray whales per year by whale-hunters under the action alternatives is unlikely to affect the prey base of killer whales in the project area. As noted in Section 4.4.3.2.3, ENP Gray Whale – Change in Distribution or Habitat Use, whale-hunt-related activities would likely have negligible affects on the present or future distribution of, or habitat use by, gray whales in the project area.

It is unlikely that any of the action alternatives would affect prey availability for other marine mammals, birds, or sea turtles through disturbance to the food chain (Section 4.3, Marine Habitat and Species). Any disturbance of prey species would probably be temporary and localized. Because of the low likelihood of prey-related effects, potential effects on species other than killer whales are not discussed further.

4.5.2.3 Potential Injury

The analysis considers the likelihood of injury to cetaceans, pinnipeds, sea otters, and sea turtles due to being struck by a ship or impacts associated with a projectile (harpoon, bullet, or grenade) used during the hunt (as measured by the amount of whale hunting activity). It is extremely unlikely that birds would sustain injury from vessels or weapons used in a whale hunt. Any birds that might be near an area where a hunt was underway would almost certainly flush from the area. This analysis, therefore, addresses potential effects on marine mammals or turtles. Increased vessel activities associated with hunt activities and other vessels present as protester, observer, or enforcement would likely focus on hunt activities, and animals in the area inadvertently might be struck and injured.

4.5.2.3.1 Marine Mammals

Under all of the action alternatives, the potential for any marine mammals to be struck by projectiles would be remote and would be possible only if another animal were mistaken for a gray whale or were immediately adjacent to a gray whale during a strike attempt. Some larger whale species could be mistaken for a gray whale during offshore hunt activities due to similar size. Makah whalers would, however, probably be able to distinguish other species from gray whales because of the characteristic blow of each species, skin color, position of the dorsal fin, behavior, and other characteristics that the whalers are trained to identify. The Tribe’s proposal includes safety measures before firing a weapon. Examples are minimum visibility and a signal from the lookout. Implementation of these measures would ensure a greater likelihood of positively identifying a gray whale before attempting a strike. Therefore, there is a very low likelihood that marine mammals, other than the target species (gray whales) would be struck by projectiles used during a whale hunt under the action alternatives.

Any killer whales that occur near gray whales would most likely be transients surveying the gray whales as possible prey. The killer whales would most likely associate only with female gray whales with calves, focusing on the calves as easy prey. Under all of the action alternatives, no strikes would be allowed on calves or adults accompanied by calves. Killer whales would probably not be near gray whales targeted by whale-hunt activities because of the age and size of the targeted whales. Makah whalers would probably not mistake a killer whale for a gray whale, and killer whales would most likely not remain close enough to whale hunting activities to be hit by an errant harpoon or projectile. For these reasons, the chances of a killer whale being struck by a harpoon or projectile during a hunt would be negligible.

There is a slight possibility that a marine mammal other than a gray whale could be injured by a ship or an errant projectile associated with the hunt. Other marine mammals do not swim close to gray whales, except transient killer whales that may be preying on gray whales, as mentioned above. For this reason, along with the safety measures the Tribe has proposed (Section 2.3.3.2.7, Public Safety Measures and Enforcement), the chances that a harpoon or errant projectile might strike marine mammals other than killer whales are considered negligible and are, therefore, not discussed further.

It is unlikely that hunt-related activities could result in injury to marine mammals due to a ship strike or propeller injury. As discussed at Section 3.4.3.6.8, Ship Strikes, ships at least 263 feet long that travel at least 14 knots cause most lethal or severe injuries to whales. Vessels engaged in a hunt and associated activities would be much smaller. The largest ship involved in the previous hunts was the 95-foot protest vessel M/V Sirenian, which remained in Neah Bay during most hunt activities. Vessels engaged in and monitoring the hunt would travel mostly at the rate of the human-powered canoe, although law enforcement vessels might have to move more rapidly to intercept protest vessels violating the MEZ.

Because of their keen acoustic capabilities, killer whales would be aware of vessels in the area and would likely move away before the vessels were close enough to cause injury. Killer whales are adept, proficient swimmers, and they would most likely avoid vessels associated with the hunt. Other marine mammals, including seals, sea lions, and cetaceans, are also adept, fast swimmers that tend to avoid moving vessels. If they were in the path of a moving vessel, they would likely dive below and away from the vessel, out of harm’s way. Sea otters are relatively slow swimmers (compared to pinnipeds) and might approach vessels when near shore. However, any otters near hunt activities would probably swim rapidly away, or dive below and away, from oncoming vessels.

4.5.2.3.2 Sea Turtles

Leatherback turtles are slow swimmers and are susceptible to collision with fast-moving vessels. Under the action alternatives, whale hunts and associated activities would result in temporary and localized increases in the number of fast-moving vessels in the vicinity of a whale hunt in the project area. Chase boats engaged in a whale hunt, as well as protest vessels and law enforcement vessels, could inadvertently strike a turtle as it surfaced for air, causing injury or death. Given the highly endangered status of this species population, the loss of even one leatherback turtle in this manner could hinder recovery efforts for this species. However, given that leatherback turtles only rarely occur off the coast of Washington, the likelihood of such incidents would be negligible.

4.5.3 Evaluation of Alternatives

The effects of the six alternatives would differ among individual species and species groups (including those identified by habitat association) depending on their use of and occurrence in the project area. For example, hunt-related activities under the action alternatives would more likely affect certain pinnipeds than most cetaceans (except gray whales), given characteristics of their foraging behavior and distribution in the project area. Pelagic species (e.g., sperm whales, leatherback turtles) would less likely be affected by the action alternatives than those that commonly occur in the coastal environment (e.g., harbor seals, bald eagles). Among pinnipeds, harbor seals and California sea lions use haulout sites in the project area (Section 4.5.2.1.1, Marine Mammals (excluding gray whales)). They would, therefore, more likely experience effects of hunt-related activities than elephant seals or fur seals, which do not breed or haul out in the area.

The potential for hunt activity to result in disturbance, reduced prey availability, or injury to wildlife would depend on the timing of the hunt, the location of the hunt, and the number of days hunting occurs. Hunting that takes place at a time when a species is present (particularly breeding) in the project area would have a higher likelihood of affecting that species than hunting that takes place when the species is not present in the project area. Hunting that takes place more than 200 yards from rocks and islands (Alternative 4) has a lower likelihood of affecting species that are present on the rocks and islands. The more days of hunting that occur, the more potential there is for effects on wildlife. As mentioned above, this analysis assumes that the amount of hunt-related activity would be the same on any given day of a hunt. Thus each day of hunting during a given season would present the same potential for effects on wildlife, as would each day of hunting that occurs outside of 200 yards around rocks and islands.

4.5.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted, and no whale hunting or associated activities (e.g., monitoring, protests, law enforcement) would be expected to occur. Levels of noise and human presence in the project area would vary with time and location, but would probably not exceed current levels. Similarly, neither prey availability nor the risk of injury or death from collision or projectiles would likely change from current conditions.

Trends in the status of health, abundance, and habitat conditions for wildlife species would continue through state and federal conservation efforts pursuant to ESA, MMPA, and the Migratory Bird Treaty Act. Prohibitions on take under these acts would continue and would require permits from NMFS and USFWS that would be subject to public review (except in the case of the Migratory Bird Treaty Act). For all species (listed and non-listed), direct mortality from anthropogenic sources would probably remain low and (for marine mammals) would not approach the PBR level. Natural mortality from predation, disease, and other sources would most likely match current levels.

Some marine mammals, specifically those in the coastal environment (e.g., harbor seals, California sea lions, Steller sea lions, and sea otter), and most birds and turtles would continue to encounter noise and vessel traffic from sport and commercial fisheries vessels, sight-seeing boats, and other sources such as military vessels. Effects on these species at current levels are unknown.

Loss of gray whales as prey to transient killer whales would continue to be variable as the gray whale population naturally fluctuates. The timing and magnitude of killer whale foraging efforts on gray whales would probably not change under this alternative. The prey base for other species (e.g., other cetaceans, pinnipeds, sea otters, and birds) would continue to vary due to natural events and human perturbations such as fishing. Ongoing variations in prey abundance would have varying effects on individual species.

A small number of marine mammals in the coastal environment would continue to be exposed to vessel traffic. This might result in vessel strikes from commercial and recreational vessels. Turtles, which are slower swimmers, may be more susceptible than other species to vessel strikes. Implementation of the No-action Alternative would not result in any increase in current low levels of injury.

4.5.3.2 Alternative 2

Under Alternative 2, whale hunting would be allowed from December 1 through May 31 in the coastal portion of the Makah U&A. Four whales could be harvested per year, on average, seven whales could be struck, and three struck and lost. If a whale were struck, it would be presumed killed. For purposes of this analysis, the maximum number of gray whales killed in any year would be seven. The Tribe estimates there could be approximately four whales exposed to unsuccessful harpoon attempts and 10 whales approached for every whale struck (Section

2.3.3.2.2, Number Harvested). Any hunting would most likely occur principally during April and May and would probably occur over 7 to 30 days (Table 4-1). With seven strikes allowed, the analysis assumes there could be a maximum of 28 rifle shots fired or 21 grenade explosions.

As part of this alternative, the Tribe would not approach within 200 yards of Tatoosh Island and White Rock during May to minimize disturbance to feeding and nesting sea birds there. No hunting would occur after June 1, additionally protecting nesting sea birds during the fledging and post-fledging period. Section 4.5.2.1, Disturbance, describes the amount of vessel and aircraft activity expected to occur on any given day of hunting.

4.5.3.2.1 Marine Mammals

Under Alternative 2, effects associated with 7 to 30 days of whale-hunting in the coastal portion of the Makah U&A could lead to an increased risk to marine mammals other than gray whales, compared to the No-action Alternative (effects on gray whales are addressed in Section 4.4, ENP Gray Whale). The greatest potential for effects would be from vessel and noise disturbance. For most species, effects would probably not differ from those described in Section 4.5.2.1.1, Marine Mammals (excluding gray whales). Species for which the effects of Alternative 2 might differ from that generalized discussion are discussed below. The intensity of the effects would depend on the number of occasions on which such disturbance occurred (related to the number of days of hunting) and the portion of the animals' life history during which they occurred (hunt timing). Any effects would probably be temporary (lasting for a few minutes to a few hours) and localized (occurring close to the hunt), and would probably not have lasting deleterious effects on individuals or populations. For all species, the number of animals close enough to hunting activities to be disturbed would likely be low.

As noted in Section 4.5.2.1.1, Marine Mammals (excluding gray whales), transient or resident killer whales might be subject to increased disturbance by noise and human activity associated with a whale hunt under Alternative 2, compared to current conditions under the No-action Alternative. The number of animals close enough to hunting activities to be affected would likely be small; any hunt-related disturbance would be localized, of short duration and would probably not have lasting effects.

Alternative 2 would most likely not affect prey availability for killer whales, as gray whales are generally abundant in the project area, and hunting regulations would prohibit the killing of calves, the primary target of killer whales. As discussed in Section 4.5.2.3, Potential Injury, the likelihood that any marine mammals might sustain an injury from a vessel or errant projectile would be extremely remote.

Steller sea lions are most abundant in the coastal portion of the Makah U&A during the time that hunting would most likely occur under Alternative 2. As mentioned above, Steller sea lions use offshore islands and rocks, closer to shore than the area where most hunting would occur, for resting and to nurse pups. Thus their haulout sites would have a very low likelihood of being affected by hunt-related activities under Alternative 2. Steller sea lions also forage in waters within the coastal portion of the Makah U&A. Hunt-related activity would increase the level of disturbance in this area beyond current levels under the No-action Alternative, thus increasing the potential for Steller sea lion foraging to be disrupted. The potential increase in disruption would likely occur over a period of 7 to 30 days during April and May. While Steller sea lions might be exposed to increased disturbance from whale hunting, beyond the level of disturbance that already occurs under current conditions (the No-action Alternative), the number of animals close enough to hunting activities to be affected by noise would probably be low. Any effects would most likely be localized and temporary. Overall effects on Steller sea lions would probably be negligible.

Sea otters are common in the coastal portion of the Makah U&A throughout the year. Vessel activity or noise from vessels, aircraft, or weapons associated with whale hunting might disturb otters that are swimming, foraging, or grooming, causing them to spend time avoiding the activity and reducing rest and grooming periods. Hunt-related activity and noise could also disrupt nursing or caring for young (Section 4.5.2.1.1, Marine Mammals (excluding gray whales)). While northern sea otters in the coastal portion of the Makah U&A might be exposed to increased levels of disturbance under Alternative 2 over a period of 7-30 days, compared to current levels of disturbance under the No-action Alternative, few animals (if encountered) are expected to remain close enough to hunting activities to be affected. Any disturbance would likely be focused on one or a few individual animals and be localized and temporary in nature. Therefore, overall effects on northern sea otters are expected to be minor.

4.5.3.2.2 Other Marine Wildlife

Under Alternative 2, effects associated with whale-hunt activities could lead to an increased risk to birds and turtles compared to the No-action Alternative. The greatest potential for effects on most species would be from vessel and noise disturbance, as described in Section 4.5.2.1.2, Other Marine Wildlife. Species for which the effects of Alternative 2 may differ from that generalized discussion are discussed below. Such effects would probably be temporary (lasting for a few minutes to a few hours) and localized (occurring near the hunt). For all species, the number of animals close enough to hunting activities to be affected by disturbance would most likely be low. Any disturbance would be localized and of short duration and would probably not cause lasting deleterious effects for individuals or populations.

Brown Pelican

Hunting under Alternative 2 hunting would be limited to the period from December 1 through May 31. Since pelicans typically do not arrive along the coast of Washington until June, there would probably be no direct or indirect impacts from this alternative. If any pelicans arrived earlier than June 1, foraging individuals could be disturbed while feeding within the nearshore marine and islands habitat associations, should a whale hunt occur nearby. The risk of such encounters would be very remote, as pelicans would be unlikely to be in the area at this time of year and if they were, they would avoid congregations of vessel activity and forage elsewhere. For any pelicans present, the amount of disturbance would probably be minor, as brown pelicans are wide-ranging and the project area is large relative to the amount of area in which hunting would take place, giving pelicans a large area in which to forage undisturbed.

Bald Eagle

Hunting would most likely occur during April and May under Alternative 2, coinciding with the early portion of the breeding season for bald eagles, and leading to increased risks over the No-action Alternative. However, most hunt-related activities would occur 1 to 2 miles offshore and would thus be unlikely to disturb eagles at active nests. If any eagles were disturbed and flushed from their nests, they might abandon their nests, particularly if the disturbance occurs before chicks hatch in May, resulting in loss of that year's chicks. Some eagles in the project area may have developed tolerance for amounts of noise and human presence, as evidenced by the continued presence of breeding pairs when recreational and commercial boating traffic has increased (Table 3-39). Over the long term, eagles may also acclimate to increases in noise and human activity associated with whale hunts. The risk of negative effects associated with hunt-related disturbance would be greatest in the short term.

Marbled Murrelet

Under Alternative 2 there could be an increased risk to marbled murrelets compared to the No-action Alternative. Hunting during April and May would have the potential to disturb adult murrelets foraging at sea, potentially reducing the amount of prey brought to chicks. Pre-breeding behaviors such as courtship and pair-bonding may also be affected during this period. The likelihood of any disturbance is low, however, because hunt-related activities would occupy a small proportion of the project area at any given time. Marbled murrelets would likely be able to find foraging opportunities in areas where no disturbance would occur. In addition, there would be no potential for hunt-related disturbance during most of the breeding season, which extends from April 1 through September 15.

Sea Turtles

Under Alternative 2 there would be a negligible increase in risks to sea turtles compared to the No-action Alternative. This is because it is extremely unlikely (though not impossible) that any of the four ESA-listed species of sea turtles would frequent areas in which a whale hunt would occur. In the unlikely event that a sea turtle was in the vicinity of whale hunting, any effects due to noise and human activity would probably be short-term and not result in any adverse effects. As discussed in Section 4.5.2.3, Potential Injury, the potential for injury to sea turtles due a ship or weapon strikes associated with a hunt would be extremely low due to the low abundance of these species throughout their range, including the project area.

Non-Listed Marine Birds and Their Associated Habitat

Under Alternative 2, hunting would likely occur in April and May over a period of 7 to 30 days in the coastal portion of the Makah U&A. Both the location and the time of year of the whale hunt coincide with the large number of marine birds using beaches, bays, and entrances to estuaries during the breeding and the winter migratory seasons. Compared to No-action Alternative, Alternative 2 would result in a greater potential for disturbance to breeding, roosting, and migrating birds. Depending on the severity of the effects, some birds' nesting attempts could fail. The potential for such occurrences to result in long-term effects on local populations of species breeding in this zone can not be determined with certainty. On one hand, many individuals may already be acclimated to a high level of human disturbance, especially in the northern portion of the Makah U&A (e.g., 4,000 annual angler trips out of Neah Bay [Table 3-23], along with other commercial and recreational vessel and aircraft traffic). On the other hand, the levels of noise and human activity associated with harpooning, securing, and dispatching a whale would be greater at that particular site than the largely transient activities that occur under current conditions. For species that use headlands and islands, Alternative 2 would provide no specific protection for the islands (other than Tatoosh and White Rock Islands) and small clusters of rock that provide breeding habitat. Hunt-related activities near these sites might disrupt nesting activity, with potential effects similar to those described for species associated with beaches, bays, and estuaries.

4.5.3.3 Alternative 3

Under Alternative 3, whale-hunting would be allowed year round in the coastal portion of the Makah U&A. Four whales could be harvested per year, on average, seven whales could be struck, and three struck and lost. If a whale were struck, it would be presumed to be killed. For purposes of this analysis, the maximum number of gray whales killed in any year would be seven. The Tribe estimates there could be approximately four whales exposed to unsuccessful harpoon attempts and 10 whales approached for every whale struck (Section 2.3.3.2.2, Numbers and Status of Whales Harvested). Hunting would most likely occur over a period of 40 days (Table 4-1). With seven strikes allowed, the analysis assumes there could be a maximum of 28 rifle shots fired or 21 grenade explosions. Alternative 3 does not prohibit hunting around any rocks and islands.

4.5.3.3.1 Marine Mammals

Under Alternative 3, effects associated with 40 days of whale-hunting the coastal portion of the Makah U&A could lead to an increased risk to marine mammals compared to the No-action Alternative. The greatest potential for effects would be from vessel and noise disturbance. For most species, effects would probably not differ from those described in Section 4.5.2.1.1, Marine Mammals (excluding gray whales). Species for which the effects of Alternative 2 might differ from that generalized discussion are discussed below. The intensity of the effects would depend on the number of occasions on which such disturbance occurred (related to the number of days of hunting) and the portion of the animals' life history during which they occurred (hunt timing). Any effects would probably be temporary (lasting for a few minutes to a few hours) and localized (occurring close to the hunt), and would probably not have lasting deleterious effects on individuals or populations. For all species, the number of animals close enough to hunting activities to be disturbed would likely be low.

For the reasons described under Alternative 2, transient or resident killer whales might be subject to increased disturbance from a whale hunt under Alternative 3, compared to current conditions under the No-action Alternative, but the number of animals close enough to hunting activities to be affected would likely be small, any disturbance would be localized and temporary, and there would likely be no lasting effects. Also for the reasons described under Alternative 2, Alternative 3 would most likely not affect prey availability for killer whales, as gray whales are generally abundant in the project area, and hunting regulations would prohibit the killing of calves, the primary target of killer whales. As discussed in Section 4.5.2.3, Potential Injury, the likelihood that any marine mammals might sustain an injury from a vessel or errant projectile would be extremely remote.

Whale hunts would likely occur year round under Alternative 3, including during the summer when Steller and California sea lions are less abundant than at other times of year, because all but a few males and juveniles of each species move out of the project area for breeding sites in Oregon or British Columbia. Hunt-related activities could, however, adversely affect harbor seals breeding on coastal islands or rocks in the project area during June and July by disrupting pupping or breeding activities or interrupting the female/pup bond during nursing. While harbor seals might be exposed to these sources of noise, the number of animals close enough to hunting activities to be affected would probably be low. Any disturbance would be localized and temporary, and overall effects on Steller and California sea lions would probably be minor.

Sea otters are common in the project area throughout the year and are most abundant during the spring. Vessel activity or noise from vessels, aircraft, or weapons associated with whale hunting that occurs during this time might disturb otters that are swimming, foraging, or grooming causing them to spend time avoiding the activity and reducing rest periods. Hunt-related activity and noise could also disrupt nursing or caring for young at haulout sites in the project area (Section 4.5.2.1.1, Marine Mammals (excluding gray whales)). While northern sea otters might be exposed to these sources of noise, the number of animals close enough to hunting activities to be affected would probably be low. Any disturbance would likely be focused on one or a few individual animals and be localized and temporary in nature. Therefore, overall effects on northern sea otters are expected to be minor.

Compared to Alternative 2, Alternative 3 could have greater potential to disturb marine mammals generally because there would be more days of hunting (40 versus 7 to 30). In addition, there would be a greater potential for hunting to occur at all times of year under Alternative 3, making it more likely that hunting activities would overlap with periods when all species might be present and/or during all sensitive periods for all species. Also compared to Alternative 2, Alternative 3 would have an increased potential for injury because there would be more days of hunting, though the potential for injury would still be negligible.

4.5.3.3.2 <u>Other Marine Wildlife</u>

Under Alternative 3, effects associated with whale-hunt activities could lead to an increased risk to birds and turtles compared to the No-action Alternative. The greatest potential for effects on most species would be from vessel and noise disturbance, as described in Section 4.5.2.1.2, Other Marine Wildlife. Species for which the effects of Alternative 3 may differ from that generalized discussion are discussed below. Such effects would probably be temporary (lasting for a few minutes to a few hours) and localized (occurring near the hunt). For all species, the number of animals close enough to hunting activities to be affected by disturbance would most likely be low. Any disturbance would be localized and of short duration and would probably not cause lasting deleterious effects for individuals or populations.

Brown Pelican

Hunting under Alternative 3 would likely occur year round in the coastal portion of the Makah U&A. Some hunting would likely occur after June 1, the time that the pelicans typically arrive along the coast of Washington. Potentially as many as 40 days of hunting could occur when pelicans are present. Compared to current conditions under the No-action Alternative, the increased level of activity in the area could increase the number of times that foraging pelicans are disturbed. Any pelicans foraging in the vicinity of a hunt would likely flush and move to another foraging area away from the disturbance. Brown pelicans are a wide-ranging species and the size of the project area is large relative to the amount of area in which hunting would take place at any given time; thus, pelicans would have a large area in which to forage undisturbed. Any effects on pelicans from hunt-related disturbance over the 40 days of hunting under Alternative 3 would likely be short-term and temporary and would probably not cause lasting deleterious effects for individuals or the population.

Compared to Alternative 2, Alternative 3 would have a greater risk of disturbing brown pelicans because hunting would be allowed during the time the pelicans are likely to be present and because Alternative 3 would likely result in more days of hunting (40 versus 7 to 30).

Bald Eagle

Hunting would most likely occur year round under Alternative 3, potentially coinciding with both the early portion of the breeding season for bald eagles, as well as during the fledging period (after chicks hatch in May), leading to increased risks over the No-action Alternative. Most hunt-related activities would occur 1 to 2 miles offshore and would thus be unlikely to disturb eagles at active nests on shore. If any eagles were disturbed and flushed from their nests, there would be a risk that they might abandon their nests, resulting in a loss of that year's chicks. If the disturbance occurred after chicks hatch in May, nest abandonment would be less likely. Some eagles in the project area may have developed tolerance for amounts of noise and human presence, as evidenced by the continued presence of breeding pairs when recreational and commercial boating traffic has increased (Table 3-39). Over the long term, eagles may also acclimate to increases in noise and human activity associated with whale hunts. The risk of negative effects associated with hunt-related disturbance would be greatest in the short term.

Compared to Alternative 2, Alternative 3 could result in greater disturbance of bald eagles primarily because of the increased number of hunting days (40 versus 7 to 30).

Marbled Murrelet

Hunting under Alternative 3 would likely occur year round over a period of 40 days. Hunting would be likely to occur during the breeding season for marbled murrelets (April 1 through September 15), which could disturb foraging murrelets and potentially reduce the amount of prey brought to chicks. Pre-breeding behaviors such as courtship and pair-bonding may also be affected during the spring. The likelihood of any disturbance is low, however, because hunt-related activities would occupy a small proportion of the project area at any given time. Marbled murrelets would likely be able to find foraging opportunities in areas where no disturbance would occur, although this could be more difficult for birds undergoing a two-month molt (which occurs during the latter half of the year).

Compared to Alternative 2, Alternative 3 has a greater potential for adverse impacts to marbled murrelets from hunt-related disturbance because hunting could occur over more days (40 versus 7 to 30) and could occur during the breeding season, when the severity of the disturbance would likely be greater.

Sea Turtles

Under Alternative 3 there would be a negligible increase in risks to sea turtles compared to the No-action Alternative. This is because it is extremely unlikely (though not impossible) that any of the four ESA-listed species of sea turtles would frequent areas in which a whale hunt would occur. In the unlikely event that a sea turtle was in the vicinity of whale hunting, any effects due to noise and human activity would probably be short-term not result in any adverse effects. As discussed in Section 4.5.2.3, Potential Injury, the potential for injury to sea turtles due a ship or weapon strikes associated with a hunt would be extremely low due to the low abundance of these species throughout their range, including the project area.

Compared to Alternative 2, there would be a slight increase in risk to sea turtles because of the increased number of days of hunting (40 versus 7 to 30).

Non-listed Marine Birds and Their Associated Habitat

Under Alternative 3, hunting would likely occur year round over a period of 40 days in the coastal portion of the Makah U&A. Both the location and the time of year of the whale hunt coincide with the large number of marine birds that uses beaches, bays, and entrances to estuaries during the breeding and the winter migratory seasons. Compared to No-action Alternative, Alternative 3 would result in a greater potential for disturbance to breeding, roosting, and migrating birds. Depending on the severity of the effects, some birds' nesting attempts could fail. The potential for such occurrences to result in long-term effects on local populations of species breeding in this zone can not be determined with certainty. On one hand, many individuals may already be acclimated to a high level of human disturbance (e.g., 4,000 annual angler trips out of Neah Bay [Table 3-23], along with other commercial and recreational vessel and aircraft traffic). On the other hand, the levels of noise and human activity associated with harpooning, securing, and dispatching a whale would be greater at that particular site than the largely transient activities that occur under current conditions. For species that use headlands and islands, Alternative 3 would not include specific protection around any rocks and islands. Hunt-related activities near these sites might disrupt nesting activity, with potential effects similar to those described for species associated with beaches, bays, and estuaries.

Compared to Alternative 2, Alternative 3 might pose a greater risk of disturbance to non-listed marine birds because hunting, and its related noise impacts, would occur throughout the breeding season, rather than just during the beginning of the breeding season. Also compared to Alternative 2, Alternative 3 would not afford specific protection to birds using Tatoosh Island and White Rock. On the other hand, due to the ability of tribal members to hunt year round, whale hunting under Alternative 3 could be more spread out over the year and less concentrated during the breeding season of April and May.

4.5.3.4 Alternative 4

Under Alternative 4, the same number of gray whales could be harvested, struck, and struck and lost as under Alternative 2 during the same season (December 1 and May 31) and in the same area (along the coastal portion of the Makah U&A). Alternative 4 would restrict hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges, a restriction that would probably not change the number of hunting days, vessels, aircraft, or weapons discharges. The restriction around rocks and islands would likely reduce some of the effects analyzed under Alternative 2 for harbor seals, California sea lions, and sea otters foraging in sanctuary and refuge waters or using refuge lands for resting or breeding. As under Alternative 2, few marine mammals would likely be exposed to hunting activities, and any effects would probably be localized and temporary. Possible adverse impacts to sea birds and turtles foraging in sanctuary and refuge waters or using refuge lands for resting or breeding would be reduced due to restrictions under this alternative. Therefore, the increased potential for adverse impacts to birds and turtles under Alternative 4, compared to current conditions under the No-action Alternative, would be similar to but slightly less than the increased potential under Alternative 2, as a larger area would be protected from frequent vessel traffic and associated noise.

4.5.3.5 Alternative 5

Under Alternative 5, whale-hunting would be allowed year round in the coastal portion of the Makah U&A. Up to two whales could be harvested per year, on average, three whales could be struck, and one struck and lost. If a whale were struck, it would be presumed to be killed. For purposes of this analysis, the maximum number of gray whales killed in any year would be three. The Tribe estimates there could be approximately four whales exposed to unsuccessful harpoon attempts and 10 whales approached for every whale struck (Section 2.3.3.2.2, Numbers and Status of Whales Harvested). Hunting would most likely occur over a period of 20 days (Table 4-1). With three strikes allowed, the analysis assumes there could be a maximum of 12 rifle shots fired or 9 grenade explosions. Alternative 5 does not prohibit hunting around any rocks or islands.

4.5.3.5.1 Marine Mammals

Under Alternative 5, effects associated with 20 days of whale-hunting the coastal portion of the Makah U&A could lead to an increased risk to marine mammals compared to the No-action Alternative. The greatest potential for effects would be from vessel and noise disturbance. For most species, effects would probably not differ from those described in Section 4.5.2.1.1, Marine Mammals (excluding gray whales). Species for which the effects of Alternative 5 might differ from that generalized discussion are discussed below. The intensity of the effects would depend on the number of occasions on which such disturbance occurred (related to the number of days of hunting) and the portion of the animals' life history during which they occurred (hunt timing). Any effects would probably be temporary (lasting for a few minutes to a few hours) and localized (occurring close to the hunt), and would probably not have lasting deleterious effects on individuals or populations. For all species, the number of animals close enough to hunting activities to be disturbed would likely be low.

For the reasons described under Alternative 2, transient or resident killer whales might be subject to increased disturbance from a whale hunt under Alternative 5, compared to current conditions under the No-action Alternative, but the number of animals close enough to hunting activities to be affected would likely be small, any disturbance would be localized and temporary, and there would likely be no lasting effects. Also for the reasons described under Alternative 2, Alternative 5 would most likely not affect prey availability for killer whales, as gray whales are generally abundant in the project area, and hunting regulations would prohibit the killing of calves, the primary target of killer whales. As discussed in Section 4.5.2.3, Potential Injury, the likelihood that any marine mammals might sustain an injury from a vessel or errant projectile would be extremely remote.

Whale hunts would likely occur year round under Alternative 5, including during the summer when Steller and California sea lions are less abundant than at other times of year, because all but a few males and juveniles of each species move out of the project area for breeding sites in Oregon or British Columbia. Hunt-related activities could, however, adversely affect harbor seals breeding on coastal islands or rocks in the project area during June and July by disrupting pupping or breeding activities or interrupting the female/pup bond during nursing. While harbor seals might be exposed to these sources of noise, the number of animals close enough to hunting activities to be affected would probably be low. Any disturbance would be localized and temporary, and overall effects on northern sea otters would probably be minor.

Sea otters are common in the project area throughout the year and are most abundant during the spring. Vessel activity or noise from vessels, aircraft, or weapons associated with whale hunting that occurs during this time might disturb otters that are swimming, foraging, or grooming, causing them to spend time avoiding the activity and reducing rest periods. Hunt-related activity and noise could also disrupt nursing or caring for young in the project area (Section 4.5.2.1.1, Marine Mammals (excluding gray whales)). While northern sea otters might be exposed to these sources of noise, the number of animals close enough to hunting activities to be affected would probably be low. Any disturbance would likely be focused on one or a few individual animals and be localized and temporary in nature. Therefore, overall effects on northern sea otters are expected to be minor.

Compared to Alternatives 2 and 4, Alternative 5 would have about the same number of occasions on which hunting, and potential disturbance, could occur (20 versus 7 to 30 days). There would be a greater potential for hunting to occur at all times of year under Alternative 5, making it more likely that hunting activities would overlap with periods when all species might be present and/or during all sensitive periods for all species. Potential for injury would be about the same because of a similar number of days of hunting.

Compared to Alternative 3, Alternative 5 would have half as many occasions on which hunting, and potential disturbance, could occur (20 versus 40 days). Weapons discharges would also likely be fewer under Alternative 5 (12 rifle shots or 9 grenade explosions versus 28 rifle shots and 21 grenade explosions). Under both alternatives, hunting could occur year round and so overlap with periods when all species might be present and/or during all sensitive periods for all species. Potential for injury would be less under Alternative 5 because of a similar number of days of hunting.

4.5.3.5.2 Other Marine Wildlife

Under Alternative 5, effects associated with whale-hunt activities could lead to an increased risk to birds and turtles compared to the No-action Alternative. The greatest potential for effects on most species would be from vessel and noise disturbance, as described in Section 4.5.2.1.2, Other Marine Wildlife. Species for which the effects of Alternative 3 may differ from that generalized discussion are discussed below. Such effects would probably be temporary (lasting for a few minutes to a few hours) and localized (occurring near the hunt), and would probably not cause lasting deleterious effects for individuals or populations. For all species, the number of animals close enough to hunting activities to be affected by disturbance would most likely be low.

Brown Pelican

Hunting under Alternative 5 would likely occur year round in the coastal portion of the Makah U&A. Some hunting would likely occur after June 1, the time that the pelicans typically arrive along the coast of Washington. Potentially as many as 20 days of hunting could occur when pelicans are present. Compared to current conditions under the No-action Alternative, the increased level of activity in the area could increase the number of times that foraging pelicans are disturbed. Any pelicans foraging in the vicinity of a hunt would likely flush and move to another foraging area away from the disturbance. Brown pelicans are a wide-ranging species and the size of the project area is large relative to the amount of area in which hunting would take place at any given time; thus, pelicans would have a large area in which to forage undisturbed. Any effects on pelicans from hunt-related disturbance over the 20 days of hunting under Alternative 3 would likely be short term and temporary and would probably not cause lasting deleterious effects for individuals or populations.

Compared to Alternatives 2 and 4, Alternative 5 would have increased risk of disturbing brown pelicans because hunting would be allowed during the time the pelicans are likely to be present.

Compared to Alternative 3, Alternative 5 would have less risk of disturbing brown pelicans. Although hunting would occur year round under both alternatives, including times when brown pelicans are present, there would be half as many occasions on which hunting would occur (20 versus 40 days).

Bald Eagle

Hunting would most likely occur year round under Alternative 5, potentially coinciding with both the early portion of the breeding season for bald eagles, as well as during the fledging period, leading to increased risk over the No-action Alternative. Most hunt-related activities would occur 1 to 2 miles offshore and would thus be unlikely to disturb eagles at active nests. If any eagles were disturbed and flushed from their nests, there would be a risk that they might abandon their nests, resulting in a loss of that year's chicks. If the disturbance occurred after chicks hatch in May, nest abandonment would be less likely. Some eagles in the project area may have developed tolerance for amounts of noise and human presence, as evidenced by the continued presence of breeding pairs when recreational and commercial boating traffic has increased (Table 3-39). Over the long term, eagles may also acclimate to increases in noise and human activity associated with whale hunts. The risk of negative effects associated with hunt-related disturbance would be greatest in the short term.

Compared to Alternatives 2 and 4, Alternative 5 would result in about the same approximate number of occasions on which disturbance would occur (20 versus 7 to 30 days). There could, however, potentially be less risk of disturbance under Alternative 3 because some of the hunting would occur after chicks hatch in May, when eagles are less likely to abandon their nest.

Compared to Alternative 3, Alternative 5 would result in less risk of disturbance to bald eagles, because there would likely be fewer occasions on which disturbance might occur (20 versus 40 days). Under both alternatives, hunting would occur year round, so the likely severity of the disturbance would be about the same under both alternatives for each hunting occasion.

Marbled Murrelet

Hunting under Alternative 5 would likely occur year round over a period of 20 days. Hunting would be likely to occur during the breeding season for marbled murrelets (April 1 through September 15), which could disturb foraging murrelets and potentially reduce the amount of prey brought to chicks. Pre-breeding behaviors such as courtship and pair-bonding may also be affected during this period. The likelihood of any disturbance is low, however, because hunt-related activities would occupy a small proportion of the project area at any given time. Marbled murrelets would likely be able to find foraging opportunities in areas where no disturbance would occur, although this could be more difficult for birds undergoing a two-month molt (which occurs during the latter half of the year).

Compared to Alternatives 2 and 4, Alternative 5 has a greater potential for adverse impacts to marbled murrelets from hunt-related disturbance. Although there would be about the same number of occasions on which disturbance could occur (20 versus 7 to 30 days), hunting under Alternative 5 could occur during the breeding season, when the severity of the disturbance would likely be greater.

Sea Turtles

Under Alternative 5 there would be a negligible increase in risks to sea turtles compared to the No-action Alternative, for the same reasons as described under Alternative 2.

Compared to Alternatives 2 and 4, there would be about the same level of risk to sea turtles because of the number of days of hunting would be about the same (20 versus 7 to 30 days).

Compared to Alternative 5 there would likely be half as much risk because there would likely be half as many days of hunting (20 versus 40).

Non-listed Marine Birds and Their Associated Habitat

Under Alternative 5, hunting would likely occur year round over a period of 20 days in the coastal portion of the Makah U&A. Both the location and the time of year of the whale hunt coincide with the large number of marine birds that uses beaches, bays, and entrances to estuaries during the breeding and the winter migratory seasons. Compared to No-action Alternative, Alternative 5 would result in a greater potential for disturbance to breeding, roosting, and migrating birds. Depending on the severity of the effects, some birds' nesting attempts could fail. The potential for such occurrences to result in long-term effects on local populations of species breeding in this zone cannot be determined with certainty. On one hand, many individuals may already be acclimated to a high level of human disturbance (e.g., 4,000 annual angler trips out of Neah Bay [Table 3-23], along with other commercial and recreational vessel and aircraft traffic). On the other hand, the levels of noise and human activity associated with harpooning, securing, and dispatching a whale would be greater at that particular site than the largely transient activities that occur under current conditions. For species that use headlands and islands, Alternative 5 would not include specific protection around any rocks or islands. Hunt-related activities near these sites might disrupt nesting activity, with potential effects similar to those described for species associated with beaches, bays, and estuaries.

Compared to Alternatives 2 and 4, Alternative 5 would result in about the same number of occasions on which non-listed marine birds could be exposed to disturbance. Alternative 5 might pose a greater risk of disturbance, however, because hunting would occur throughout the breeding season, rather than just during the beginning of the breeding season. Also compared to Alternatives 2 and 4, Alternative 5 would not afford specific protection to birds using rocks and islands in the project area. On the other hand, due to the ability of tribal members to hunt year round, whale hunting under Alternative 5 could be more spread out over the year and less concentrated during the breeding season of April and May.

Compared to Alternative 5 there would likely be half as much risk to non-listed marine birds because there would likely be half as many days of hunting (20 versus 40) spread throughout the year.

4.5.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunt attempts and the same number of whales struck, harvested, and struck and lost as Alternative 3. The potential for adverse impacts to other wildlife would thus be about the same under Alternative 6 as under Alternative 3. Some effects might be slightly different either because a species might occur more or less in the Strait or might complete a part of its life history differently (including at a different time) in the Strait than in the coastal portion of the Makah U&A. The following sections discuss any potential differences between effects under Alternative 3 and 6 due to these differences.

4.5.3.6.1 Marine Mammals

Sea otters are more likely to use the coastal portion of the Makah U&A than the Strait, although they briefly moved into the Strait in the 1990s. If some hunting under Alternative 6 were diverted to the Strait, Alternative 6 would thus have a lower risk of disturbance to sea otters. Harbor seals have a longer pupping season in the Strait than in the coastal portion of the Makah U&A (June to August in the Strait versus June and July on the coast). Thus there is a longer period of time that hunting in the strait could disturb harbor seals and nursing pups. Whale-hunt-related activities from June through August near seal pupping or nursing sites could cause short-term interruption of the mother/pup relationship. As with effects described under Alternative 3 for the coastal portion of the Makah U&A, few marine mammals of any species would likely be disturbed by hunting activities, and any disturbance would probably be localized, temporary, and not have lasting effects.

4.5.3.6.2 Other Marine Wildlife

Under Alternative 6, more potential habitat for wintering, nesting, and foraging eagles and foraging marbled murrelets would potentially be exposed to disturbance from hunt-related activities, as more coastline would be exposed to hunting. On the other hand, because of the larger area in which hunting could occur, noise from hunting activities potentially affecting other marine wildlife would be more spread out. Overall, such noise would probably not affect any more eagles than if the hunt were confined to the outer Washington coast. The density of marbled murrelets is known to be higher in the Strait of Juan de Fuca (Huff et al. 2006) so more individual birds may be disturbed by hunt-related activities in this area. Marbled murrelets would likely be able to find foraging opportunities in areas where no disturbance would occur, although this could be more difficult for birds undergoing a two-month molt (which occurs during the latter half of the year).

It is unlikely that any ESA-listed species of sea turtles would come into the Strait of Juan de Fuca while migrating or foraging off the Washington coast. Thus risks would be lower under Alternative 6.

Under Alternative 6, more habitat for non-listed nesting and foraging sea birds in the project area would potentially be exposed to disturbance from hunt-related activities than under the other action alternatives, because more area around coastline and islands would be exposed to hunting. However, as mentioned above, the disturbance associated with hunt-related activities under this alternative would probably be more widely distributed than under the other action alternatives. Furthermore, because more rocks, islands, and associated densities of nesting sea birds occur along the outer coast of the project area, expanding the hunting area to the strait would probably result in a shift of some of the hunting away from these sensitive areas and to the strait. This shift in hunting activity would result in a lower risk to nesting seabirds in the project area as compared to Alternative 3.

4.6 Economics

4.6.1 Introduction

This section addresses the potential for the alternatives to affect economic conditions in the project area. Whale-hunt-related activities have the potential to affect tourism, the household use of whale products, the whale-watching industry, shipping, sport and commercial fishing, and hunt-related management and law enforcement. As discussed in Section 3.6, Economics, the labor force residing on the Makah Reservation in 2000 was about 613 persons, or approximately 3 percent of the total wage and salary workforce in Clallam County. Total personal income for the Makah Reservation is probably an even smaller proportion of countywide total personal income, because per capita income of reservation residents is substantially lower than countywide per capita income (Section 3.6.3.2.3, Personal Income). Because the economic contribution of the Makah Reservation to the countywide economy is so small, the potential for any changes on the reservation under the alternatives to have a noticeable effect on economic conditions in Clallam County as a whole is negligible. Moreover, economic effects outside the reservation are expected to be negligible in the context of the countywide economy. For these reasons, potential effects on Clallam County as a whole will not be addressed in this analysis.

One potential economic effect of the action alternatives that was not included in this analysis was the economic burden on individuals or households engaged in hunting if the cost of hunting is borne by individuals rather than by the tribal government. In 2002, the Makah tribal Council decided not to provide financial support for a hunt, leaving it up to whale-hunting families to support any hunts, consistent with tribal tradition. However, the Council did not indicate whether it would financially support future hunts should they be authorized. If individual families were to finance hunts under the action alternatives, the economic impacts on some Makah households could be substantial, given the high costs of supplies and services necessary to participate in the numerous activities related to whale hunting. Aside from the expenses of actually engaging in the hunt, there would be the costs of acquiring seagoing canoes and other whale-hunting equipment, training time, and hosting ceremonial feasts. These costs must be viewed in the light of both the depressed economic situation of many Makah households (Section 3.6.3.2.3, Personal Income) and the Makah Tribe restriction that prohibits tribal members who participate in a whale hunt from receiving monetary compensation. It is likely that a family would launch its own whale hunting enterprise only if that family were economically successful during the several months between whale hunting seasons.

These economic constraints would likely affect the number of hunts that could take place in any given year. However, the magnitude of the household costs arising from the whale hunt, and the distribution of these costs across the Makah community, were not reasonably foreseeable because of uncertainty about what costs families would bear rather than the community as a whole, and about the number of families that would organize a whale-hunting crew.

4.6.2 Evaluation Criteria

The criteria used to determine the potential for effects on economic conditions under the alternatives include the potential change in revenue, employment, and/or economic value associated with (1) tourist-related business activity, (2) household consumption of whale products and manufacture and sale of traditional handicrafts, (3) the whale-watching industry, (4) commercial shipping and sport and commercial fishing, and (5) hunt-related management and law enforcement. The following sections discuss these matters in greater detail and identify how the effects of the alternatives may be assessed and differentiated.

4.6.2.1 Tourism

Tourism is a relatively large industry in Clallam County; visitors spent $140 million in the County in 2003 (Table 3-17). Spending in the food and beverages services sector accounted for about 28 percent of total visitor spending and in the accommodations sector accounted for about 19 percent of total visitor spending. Figures are not available for the amount of revenue generated by reservation tourism and recreation or the number of jobs and amount of personal income that depend on visitor spending, but about 10 percent of jobs in the local area are in sectors that depend directly on tourism (Table 3-22).

Activities associated with a whale hunt, including the hunt itself and harvest-related ceremonies and celebrations, have the potential to affect the tourism industry in Clallam County by changing the number of visitors to the area and their travel expenditures. Persons seeking opportunities to view a whale hunt may visit trails and beaches in the Olympic National Park, OCNMS, and the Makah Reservation. It is possible that visitation to these areas would increase under the action alternatives, as interested observers seek vantage points to view the hunt. Also, there is the potential for persons attracted to the area by hunt-related activities (such as protesters, law enforcement officers, media representatives, or other observers) to engage in other activities, such as camping, sightseeing, or wildlife viewing. Spending associated with these activities could increase under the action alternatives.

As described in Section 3.6.3.3.1, Summary of Economic Effects of the Makah Gray Whale Hunts, no quantitative information is available concerning the economic effects of the Makah Tribe's practice whale hunt exercises in late 1998, or their whale hunting in the spring of 1999 and of 2000. Protests and media coverage of these events may have temporarily generated an increase in the number of people in the area, who might have sought accommodations and services in the communities of Neah Bay, Clallam Bay, and Sekiu. Some anecdotal information suggests this was the case, while other anecdotal information suggests it was not. No economic data demonstrate that the influx of visitors during previous hunt-related events resulted in an increase in the number of rooms rented or in other economic activity. Given the likely influx of visitors coming to Neah Bay to observe, protest, or report on the hunt, or to participate in tribal ceremonies and celebrations, it is reasonable to expect there would be a short-term increase in tourist-related business activity associated with these visitors. Any short-term effect is likely to be minor, and may diminish as more hunts occur. Section 3.6.3.3.1, Summary of Economic Effects of the Makah Gray Whale Hunts, indicates that there were fewer protestors at the 2000 hunt than the 1999 hunt. Over the long term, there is no information suggesting that the hunts in 1999 and 2000 had any lasting effect on tourism in Clallam County or Neah Bay. Thus, while a whale hunt might attract visitors to the Neah Bay area, it is likely that any positive effect would be short-term and minor.

In addition to attracting visitors to Clallam County when hunt-related activities occurred, Makah whale hunting might have a broader and longer-term positive effect on the Tribe's efforts to bolster the tribal tourism sector of the reservation economy. As Jollie and Green (2001) report:

> Visitors mostly learned about the Makah Tribe through whaling notoriety and Olympic National Park and hiking trail advertisements. . . . The controversy over whaling has had a direct impact on tourism as people are drawn to the area by media reporting of the whaling events.

Controversy surrounding resumption of whale hunting has rekindled international interest in the Makah people at the same time as tribal tourism and other types of cultural tourism are rapidly gaining popularity throughout the world (Washington State Parks 2004). The Makah Tribe has been an active participant in programs by Washington State and the Affiliated Tribes of Northwest Indians to market tribal tourism (Affiliated Tribes of Northwest Indians undated; Jollie and Green 2001; May 2001). Although the government sector is the dominant employer on the Makah Reservation (Section 3.6.3.2.2, Employment), tourism is also considered a key element of the local economy (Section 3.6.3.2.4, Contribution of Tourism to the Local Economy).

Any positive effects of a whale hunt on tourism (both locally and County-wide) could be offset to some extent if opposition to the hunt resulted in boycotts of Olympic Peninsula tourism activities, including boycotts of Neah Bay specifically. Section 3.6.3.3.1, Summary of Economic Effects of the Makah Gray Whale Hunts, describes efforts to organize a boycott of the Makah nation, but no available information indicates the boycott had any effect on tribal enterprises. Similarly there is no evidence that calls for boycotts of Olympic Peninsula tourism had any negative economic impact on tourist-related businesses in the area. It is possible that some persons who might participate in a boycott would not do so if the whale hunting is conducted with restrictions on hunt timing, area, or the number or identity of whales that may be struck. Protest activities and vocal opposition to the hunt have come from groups that have expressed opposition to whale hunting under any conditions, however (Section 4.8.3, Social Environment, Evaluation of Alternatives). Persons opposed to whale hunting under any conditions would be likely to participate in a boycott under any of the action alternatives.

The effects on tourism would depend primarily on (1) the anticipated number of persons who might be attracted to the area by hunt-related activities (such as reporters, protestors, or observers), and (2) the anticipated amount, intensity, duration, scope, and content of media coverage. These two factors are also discussed in Section 4.12, Aesthetics.

4.6.2.2 Household Use of Whale Products

Under current conditions, Makah tribal members do not have the opportunity to consume freshly harvested whale products. Drift whales or whales incidentally caught in fishing operations may provide an opportunity to consume whale products or to produce hand-crafted articles made from whale products (Section 2.4.2, Subsistence Use of Drift Whales). If a whale hunt were authorized under any of the action alternatives, Makah tribal members could consume the meat, blubber, and other edible products obtained from harvested whales (Section 2.3.3.2.6, Whale Product Use and Distribution). Moreover, within the borders of the United States, tribal members could share whale products from any hunt with relatives of participants in the harvest, with others in the local community (both non-relatives and relatives), or with persons in locations other than the local community with whom local residents share familial, social, cultural, or economic ties.

Subsistence foods products from a whale would not generate revenue through market sales, but would meet nutritional needs of Makah families. Thus attaching a dollar value to food products from harvested whales is difficult. Nevertheless, the harvest of whales for food has economic value to households as they potentially replace foods that families would otherwise have to purchase. The distribution of subsistence products through sharing networks makes it likely that many households and individuals would enjoy the economic benefits of a whale harvest.

The Tribe’s 2006 household whale hunting survey indicated that 80 percent of those surveyed desired whale meat as part of their regular diet (Section 3.10.3.5.1, Makah Whaling). Considering the numbers of whales that could be harvested under the action alternatives, and the customary sharing of subsistence resources among tribal members (Section 3.10.3.5.2, Makah Subsistence Consumption), the per capita economic value of whale products as a food resource would probably be small. The whale products consumed in 1999 equaled approximately 2.4 pounds per capita (Section 3.10.3.5.1, Makah Whaling). Nevertheless, the reintroduction of whale food products into the Makah community could help offset potential food shortages if other subsistence resources diminish, and could prevent people from having to spend cash to replace subsistence foods (Renker 1996; 2007).

In addition, the Makah Tribe could sell or offer for sale non-edible whale products used to create authentic articles and native handicraft and clothing, including artwork, within the United States under any of the action alternatives (Section 2.3.3.2.6, Whale Product Use and Distribution). A whale hunt would likely increase the availability of non-edible whale products for the manufacture and sale of traditional handicrafts. The Makah have a long tradition of manufacturing carvings, baskets, and other items for sale to collectors and tourists (Erikson 2003), and “[t]ribal artisans also produce carvings, jewelry, and silk screen designs for sale in local shops and regional galleries” (Section 3.6.3.2.1, General Description of the Local Economy). Seventy-six percent of Makah households expressed a desire for whale bones, possibly to revitalize certain crafts (Section 3.10.3.5.1, Makah Whaling). Hand-crafted articles made from whale products could become sources of income for some Makah households and a means of perpetuating indigenous art forms and crafts. Renker (1996) notes that the bones of a gray whale incidentally caught in 1995 were distributed to Makah artists through the Makah Cultural and Research Center, which is one of the largest retail outlets of Makah artwork on the reservation (Erikson 2003). According to Renker (2007), some Makah indicated they were disappointed that the bones of the whale harvested in the 1999 hunt were not made available to the community for private use. They were used by the local school for a bone preservation project instead (Section 3.10.3.5.1, Makah Whaling).

The amount of whale products for household consumption and the manufacture and sale of traditional handicrafts would depend on the number of whales that could be harvested.

4.6.2.3 Whale-watching Industry

Whale-watching is not economically important in Clallam County, but there are whale-watching operations outside the county in Westport, Washington and Vancouver Island, British Columbia (Section 3.6.3.3.2, Commercial Value of Whales). Information on the current numbers of whale-watching expeditions, whale-watching passengers, whale-watching revenues in these areas, or people employed in the whale-watching sector is not available. A Makah gray whale hunt could affect whale-watching revenues or employment if a hunt caused prospective passengers to avoid whale-watching, if a hunt occurred in the vicinity of whale-watch operations and disturbed whales away from the area, or if whales altered their behavior as a result of hunting and avoided whale-watching vessels. For the reasons discussed below, it is unlikely that whale-hunting under any of the action alternatives would have more than a negligible effect on whale-watching revenues or employment within or outside the project area through any of these mechanisms.

First, while negative publicity about Makah whale hunting could reduce public participation in whale-watching in general, there is no information demonstrating such an effect. In addition, it is unlikely that whale-hunting activities under the action alternatives would interfere with whale-watching tours in the project area. There is no evidence that whale-watching operators conduct tours targeting gray whales in the project area. There are few whale-watching tours or charters in Clallam County, although whale-watching charters are available through one resort in Sekiu and may be available through some sport fishing boat operators (Section 3.6.3.3.2, Commercial Value of Whales). Most whale-watching operations in Washington State focus on killer whales in Puget Sound and the eastern portion of the Strait of Juan de Fuca (an area outside the Makah U&A) (NMFS 2001). While gray whale watching is an important tourist activity off Westport, located on Washington's Pacific coastline at Grays Harbor (Section 3.6.3.3.2, Commercial Value of Whales), that area is approximately 80 miles south of the Makah U&A. Most of Westport's charter boat businesses offer whale-watching trips from March to May, when gray whales can be viewed just off the coast during their annual migration. It is unlikely that these tour operators would expend the time and fuel to travel to the Makah U&A when gray whales are present immediately offshore. Whale-watching tours from Westport, therefore, would be unlikely to encounter hunt-related activities under any of the action alternatives. The gray whales are northbound at that time and pass Westport before reaching the Makah U&A farther north. Whale-hunting activities under any of the action alternatives, therefore, would be extremely unlikely to scare whales away from areas where they may be encountered by whale-watching tours out of Westport, even during the peak tour period of March through May.

Whale-watching is also an important tourist activity off Vancouver Island (Section 3.6.3.3.2, Commercial Value of Whales). Although most Vancouver Island-based whale-watch operators also advertise opportunities for viewing other wildlife, including gray whales, the whale-watching tours and charters focus largely on opportunities for viewing killer whales. Further, none of these operators describes tours that include the Makah U&A.

Finally, it is unlikely that gray whales would respond to a Makah tribal hunt by avoiding whale-watch vessels (Section 3.4.3.6.6, Vessel Interactions). ENP gray whales have been exposed to hunting for decades by Chukotka natives, yet that ongoing hunt has not translated into a general avoidance of boats by gray whales (NMFS 2001; Hoyt and Hvenegaard 2002). There is no evidence to suggest that hunting by the Makah Tribe would cause a change in behavior that has not yet been demonstrated to result from a far more extensive hunt. ENP gray whale behavior also does not appear to have been affected by other types of human and vessel activity. As described in Section 3.4.3.6.6, Vessel Interactions, these whales migrate through waters occupied by large numbers of commercial and private vessels. Off the coast of Los Angeles, California, during the whale-watching season, Rugh et al. (1999) reported that 8 to 12 boats may follow a single whale. The number of approaches incident to Makah whale hunting would be minor compared to the whales' existing level of exposure to vessels.

If a Makah gray whale hunt were to alter gray whale behavior, it is not possible to estimate the amount of decrease that might occur in revenues of whale-watch operators. Current revenues of whale-watch operators are unknown, and there is no information available or that could reasonably be obtained that would allow an estimation of how much whale-watching revenues might decrease if gray whale behavior were altered by a Makah hunt. The extent to which a Makah hunt had an effect on gray whale behavior, and a subsequent indirect effect on whale-watching revenues, would depend primarily on factors that could cause whales to avoid boats, including the number of whales that could be struck and the estimated number of whales with harpoon attempts and approaches.

4.6.2.4 Shipping and Ocean Sport/Commercial Fishing

Under current conditions, the value of commercial shipping in Washington State is $63 billion, a substantial proportion of which is the result of shipping that passes through the project area (Washington Joint Transportation Committee 2007, see Section 3.6.3.1.4, Commercial Shipping). Estimated revenues from sport fishing trips from Neah Bay that targeted salmon, steelhead, groundfish, halibut, and albacore tuna ranged between about $1.6 million and $2.4 million annually (in 2000 dollars) from 1997 to 2004 (Section 3.6.3.2.5, Contribution of Ocean Sport Fishing to the Local Economy). Most fishing derbies in Clallam County take place during late spring through early autumn. The value of commercial fish landings at the Port of Neah Bay since 2000 has ranged from $4.0 to $5.7 million annually (Section 3.6.3.2.6, Contribution of Ocean Commercial Fishing to the Local Economy).

If whale-hunting restricted the operations of commercial shipping traffic or sport and commercial fishing vessels, it could affect revenues or employment associated with these sectors. Vessels not involved in whale hunting would have to maintain prudent distances from whale hunts as a safety precaution. As discussed in Section 2.3.3.2.7, Public Safety Measures and Enforcement, there would be a moving exclusionary zone (MEZ) with a 500-yard radius centered on tribal vessels actively engaged in a whale hunt under any of the action alternatives. No person or vessel would be able to enter the MEZ when it was activated, except for the authorized Makah whale hunt vessel, a media pool vessel preauthorized by the Coast Guard, or another vessel or person preauthorized by the Coast Guard. The requirement to remain outside the MEZ could increase operating costs if it caused vessels to take longer routes to reach their destinations or could decrease revenues if it prevented fishing vessels from accessing fishing grounds. It is possible that revenues associated with shipping, sport fishing, or commercial fishing could decrease in response to these restrictions.

The small size and limited duration of the MEZ would likely result in negligible disruption of commercial shipping or sport and commercial fishing. Further, as described in Section 4.13.2.2, Marine Traffic, hunt-related activities would probably not interfere with commercial shipping traffic because most, if not all, hunting would likely occur within the Coast Guard RNA, which lies almost entirely within the OCNMS area to be avoided.

The potential for any of the alternatives to affect shipping or sport and commercial fishing would depend primarily on the number of times the MEZ would be activated. It is not possible to predict how many times the MEZ would be activated on a given day of hunting, but it is reasonable to expect that the number of times per day of hunting would be the same, on average. For sport fishing operations, the potential for an effect could also depend on the season that hunting is allowed. Sport fishing for salmon occurs during the summer and early fall, while sport fishing for other species occurs year round (Section 3.6.3.2.5, Contribution of Ocean Sport Fishing to the Local Economy). Hunting that occurs on summer days would have a greater potential to affect sport fishing than hunting that occurs on winter days.

4.6.2.5 Management and Law Enforcement

Under current conditions, NMFS' annual budget for marine mammal management in the Northwest Region ranges from zero to $500,000 per year. The overall budget for monitoring the ENP gray whale population is approximately $65,000. Within the ENP gray whale budget, funding has been provided for photo-identification studies of gray whales in local survey areas with one purpose, among others, being management of a potential Makah gray whale hunt. It is uncertain whether NMFS would continue to fund the photo-identification program if a hunt was not authorized. Because no gray whale hunting currently occurs, there are no NMFS observers associated with a hunt.

If a whale hunt were authorized under any of the action alternatives, it is likely that hunting would be monitored and evaluated for its impact on the ENP gray whale population in general and on whales identified in local survey areas in particular. Funding would likely continue for the photo-identification studies aimed at identifying whales in local survey areas. Estimated annual costs for the photo-identification study are $65,000 (NMFS 2008). Funding would also likely be provided for NMFS and Makah observers during and immediately following a hunt (Section 2.3.3.2.7, Other Environmental Protection Measures). Cost of a NMFS observer could be as high as $7,000 per month (i.e., averaging $233 per day of hunting) (NMFS 2008).

If whale hunting by the Tribe engendered protests by whaling opponents, as it has in the past, there would likely be law enforcement operations to maintain order. Past law enforcement activities have involved the United States Coast Guard, NMFS Office of Law Enforcement, the State of Washington, Clallam County Sheriff's Office and Makah tribal police. Estimated costs for all but non-tribal agencies could approach $43,000 per day, with the bulk of costs associated with United States Coast Guard aircraft and vessels (NMFS 2008, Table 4-3). An additional $2,790 per month could be incurred to provide mobile command facilities for enforcement personnel (NMFS 2008)

Under any of the action alternatives, costs associated with hunt observers or with law enforcement would depend primarily on the number of days of hunt-related activity (which could include preparations for hunts and protests of hunt; Table 4-3). It is not possible to predict the number of days of preparation or protests that would occur for each day of hunting. Estimated enforcement costs for any of the alternatives may therefore be conservative. Costs for photo-identification studies would likely be the same regardless of the action alternative implemented.

4.6.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect economic conditions both within and outside the project area. Potential effects outside the project area include such things as changes in revenue or employment associated with whale-watching and tourism. For each alternative, the discussion addresses the potential effects on tourism, household use of edible and non-edible whale products, the whale-watching industry, commercial shipping and sport and commercial fishing, and management and law enforcement.

Under any of the action alternatives, tourist-related enterprises in and around the project area could experience a minor increase in business activities over the short term. Interested tourists and other visitors would most likely visit the project area to observe the whale hunt and might participate in harvest-related celebrations as media stories raised public awareness of the Makah whale hunt and the Tribe's whale hunting tradition. Some individuals might decide not to visit the project area based on negative publicity about the whale hunt. Overall, it is reasonable to expect more visitors would be drawn to the area than avoid the area as a result of a whale hunt, potentially resulting in a minor short-term increase in tourism-related business activity. The amount of any such potential short-term increase would likely depend on the number of days of hunting under a particular alternative. Thus alternatives with more days of hunting would likely result in a greater increase.

The potential also exists for increased long-term business activity as a result of expansion of the tribal tourism sector of the reservation economy. Such a potential is likely linked to whether hunting occurs at all and is therefore likely to be similar across all of the action alternatives.

Under any of the action alternatives, the potential for whale products to become available for household consumption and the making and selling of handicraft articles would increase due to the opportunity for tribal members to harvest whales. The amount of any increase would depend on the number of whales likely to be harvested under a particular alternative. Thus alternatives with higher harvest levels would likely result in a greater increase.

The lowest risk of adverse effects on whale-watching operators, commercial shipping traffic and sport and commercial fisheries would occur under the No-action Alternative because no whale hunts would be permitted under this alternative. Under any of the action alternatives, it is unlikely that Makah whale hunting would have more than a negligible effect on whale-watching, for the reasons described above (Section 4.6.2.3, Whale-watching Industry). To the extent such an impact did occur, its amount would probably depend on the number of whales that could be struck or exposed to harpoon attempts and approaches. Thus alternatives that result in greater numbers of strikes, harpoon attempts, or approaches would have a greater potential to adversely affect whale-watch operators.

The potential for disruption of commercial shipping traffic and sport and commercial fisheries would probably be negligible because of the small size and duration of the MEZ. To the extent such an impact did occur, its amount would probably depend on the number of times the MEZ was activated, which would depend on the number of days of hunting. Thus alternatives that result in more days of hunting would have a greater potential to adversely affect commercial shipping traffic and sport and commercial fisheries.

The potential for economic effects associated with the costs of law enforcement and management would be lowest under the No-action Alternative, while alternatives that involve more days of hunting and longer hunting seasons could potentially have higher associated costs.

4.6.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted, and no whale hunting or associated activities (e.g., ceremonies, celebrations, protests, monitoring, law enforcement) would be anticipated. There would be no potential for visitors to view hunt-related activities in the project area or to participate in harvest-related celebrations. There would also be no potential for media coverage of the whale hunt that might, in turn, generate interest in the Makah Reservation as a cultural tourism destination. Consequently, the level of business activity for tourist-related enterprises in and around the project area would not be expected to differ from the current level.

With the possible exception of products from drift whales, there would be no potential for households to consume whale meat and blubber or use non-edible whale products for the manufacture and sale of traditional handicrafts. There would be no potential for a whale hunt to disrupt the whale-watching industry, commercial shipping, or sport or commercial fishing. Consequently, the economic conditions of the whale-watching industry, commercial shipping, and sport and commercial fishing would probably not differ from current conditions. The lack of whale hunting would make monitoring and enforcement unnecessary, so there would be no additional costs associated with these activities. The current costs for photo-identification studies may or may not continue.

4.6.3.2 Alternative 2

Under Alternative 2, hunting would be expected to occur on a total of 7 to 30 days, mostly during April and May. The limit on the number of struck whales would be seven and the limit on the number of harvested whales would be an average of four per year with a maximum of five in any one year. Approximately 28 whales would be exposed to harpoon attempts and 140 would be approached annually. Compared to the No-action Alternative, under which there would be no hunting, Alternative 2 is likely to result in (1) minor short-term increases in tourism from the likely 7 to 30 days of hunting, (2) an increase of four whales annually available for household use by Makah tribal members, (3) negligible changes in whale-watching revenues, (4) minor increases in interference with shipping and sport/commercial fishing vessels, and (5) an increase in expenditures for management and law enforcement.

4.6.3.2.1 Tourism

Under Alternative 2 visitors would likely be drawn to the project area on the 7 to 30 days that whale-hunting that would occur, potentially creating a minor increase in the level of business activity for nearby tourist-related businesses, compared to the No-action Alternative (under which no visitors would come to the project area to observe whale hunts). The increased business activity would likely be short-term (lasting only during the period that the whale hunt was occurring), as visitors would come to observe the hunt and to participate in harvest-related celebrations. Hunting would be allowed from December 1 through May 31, but would most likely occur during April and May. Potential inclement weather during April and May could deter visitors from coming to observe a whale hunt or participate in harvest-related ceremonies.

It is uncertain whether a hunt would result in a long-term increase in tourism. Publicity about the whale hunt could generate interest in the Makah Reservation as a cultural tourism destination, while some individuals might not visit the project area due to negative publicity about the whale hunt.

4.6.3.2.2 Household Use of Whale Products

Compared to the No-action Alternative (under which no whales could be harvested and the Tribe would have access only to drift whales or whales incidentally caught in fishing gear), up to five whales annually could be harvested under Alternative 2, with an average annual harvest of four whales allowed. Limits would be placed on the harvest of identified whales, which could affect the Tribe's ability to harvest the full number of whales allowed. The hunting season would be restricted to the period from December 1 through May 31, with most hunts likely occurring during April and May. Potential inclement weather during these months would likely affect the number of days the Tribe could hunt, which could also affect the Tribe's ability to harvest the full number of whales allowed.

Under Alternative 2 the amount of whale products available for household consumption, manufacturing, and selling of traditional handicrafts would increase over current conditions (the No-action Alternative). The increase would come from whales the Tribe was actually able to harvest, which would likely be four whales annually. The actual number of whales harvested each year may be lower because of the constraints on identified whales and hunting season.

4.6.3.2.3 Whale-watching Industry

Compared to the No-action Alternative (under which no whales would be struck, exposed to harpoon attempts, or approached by hunters), under Alternative 2, up to seven whales may be struck annually, 28 exposed to unsuccessful harpoon attempts, and 140 approached. Limits would be placed on the harvest of identified whales, which could affect the Tribe's ability to harvest the full number of whales allowed. This in turn could affect the number of whales struck, exposed to unsuccessful harpoon attempts, and approached. The hunting season would be restricted to the period from December 1 through May 31, with most hunts likely occurring during April and May. Potential inclement weather during these months would likely affect the number of days the Tribe could hunt, which could also affect the number of whales struck, exposed to unsuccessful harpoon attempts, and approached.

As described in Section 4.6.2.3, Whale-watching Industry, there is no information to suggest individuals would avoid whale-watching tours if a Makah hunt is authorized, and it is unlikely that Makah hunting would activities would overlap geographically with whale-watching tours. It is also unlikely that gray whales would respond to a Makah tribal hunt by avoiding whale-watch vessels. As described in Section 4.5, Other Wildlife, it is likely that any effects of a hunt on other marine mammals, which might be a target of whale-watch operators, would be localized and temporary. To the extent such an effect might occur under Alternative 2, it is not possible to estimate the amount of decrease that might occur in revenues of whale-watch operators. Current revenues of whale-watch operators are unknown, and there is no information available or that could be obtained that would allow an estimation of how much revenues might decrease if ENP gray whale behavior were altered by a Makah hunt.

4.6.3.2.4 Shipping and Ocean Sport/Commercial Fishing

Compared to the No-action Alternative (under which there would be no whale hunts and no activation of the MEZ) activation of the MEZ on 7 to 30 days during a whale hunt under Alternative 2 would lead to an increased potential for restricting operations of commercial shipping vessels and sport and commercial fisheries. Hunting would occur primarily in April and May.

The small size and limited duration of the MEZ would likely result in negligible disruption o f commercial shipping or sport and commercial fishing. Further, as described in Section 4.13.2.2, Marine Traffic, hunt-related activities would probably not interfere with commercial shipping traffic because most, if not all, hunting would likely occur within the Coast Guard RNA, which lies almost entirely within the OCNMS area to be avoided. Also, most sport fishing for salmon occurs outside the time that whale hunting would take place under Alternative 2. Consequently, only minor economic impacts to commercial shipping or sport and commercial fisheries would be expected as a result of implementing Alternative 2.

4.6.3.2.5 Management and Law Enforcement

Compared to the No-action Alternative (under which no whale-hunting or associated protests would occur) Alternative 2 could result in 7 to 30 days of hunting and associated protests. The costs for hunt observers would increase over current conditions by the number of days of hunting. The cost for law enforcement would increase over current conditions by the number of days activities occurred that required a law enforcement presence. Such activities might include hunting, protests, and ceremonies. Actual days of hunting would represent the minimum number of days on which a law enforcement presence might be required, while the number of days requiring a law enforcement presence might be twice as many days as actual days of hunting. It is uncertain whether the existing photo-identification study would continue to be funded under the No-action Alternative. If not, then its continuation under Alternative 2 would represent an increased cost beyond current conditions.

Under Alternative 2, costs would be incurred for NMFS and Makah observers during the 7 to 30 days that hunting occurred, resulting in an increase in costs over current conditions (the No-action Alternative). Estimated costs for a NMFS observer for 7 to 30 days could be as high as $7,000 (based on a monthly rate) (NMFS 2008).

If whale hunting by the Tribe engenders protests by whaling opponents, as it has in the past, there could also be costs associated with law enforcement activities. It is not possible to predict how many of the 7 to 30 days of hunting likely under Alternative 2 would require a law enforcement presence, or which governmental entities would provide law enforcement (federal, state, local and tribal). As described under Section 4.6.2.5, Management and Law Enforcement, estimated costs for all non-tribal enforcement agencies could approach $43,000 per day, with overall costs ranging from $529,232 to as much as $1.5 million depending on the number of hunt days (Table 4-3). As with the other alternatives, the bulk of costs would be associated with United States Coast Guard aircraft and vessels (NMFS 2008).

4.6.3.3 Alternative 3

Under Alternative 3, hunting would be expected to occur on a total of 40 days year round. The limit on the number of struck whales would be seven and the limit on the number of harvested whales would be an average of four per year with a maximum of five in any one year. Approximately 28 whales would be exposed to harpoon attempts and 140 would be approached annually. Compared to the No-action Alternative, under which there would be no hunting, Alternative 3 is likely to result in (1) minor short-term increases in tourism from the likely 40 days of hunting, (2) an increase of four whales annually available for household use by Makah tribal members, (3) negligible changes in whale-watching revenues due to changes in whale behavior as a result of interactions between hunters and whales, (4) minor increases in interference with commercial shipping and sport and commercial fishing vessels, and (5) an increase in expenditures for management and law enforcement over the likely 40 days of hunting.

4.6.3.3.1 Tourism

Compared to the No-action Alternative (under which no whale hunts would occur to draw visitors to the project area), the whale hunt and associated activities under Alternative 3 would likely draw visitors to the project area on the days that hunting occurred, potentially creating a minor increase during those days in the level of business activity for tourist-related enterprises nearby. The increased business activity would likely be short term (lasting only as long as the hunt), as visitors would come to observe the hunt and to participate in harvest-related celebrations. Thus potential increases in business activity under Alternative 3 would likely occur on a total of 40 days. Because there would be no limits on the hunting season, hunting would likely occur year round. It is uncertain whether a hunt would result in a long term increase in tourism. Publicity about the whale hunt could generate interest in the Makah Reservation as a cultural tourism destination, while some individuals might not visit the project area due to negative publicity about the whale hunt.

Compared to Alternative 2, the increased number of days of hunting (40 versus 7 to 30) would probably result in more visitors who would come to the Makah Reservation to observe a whale hunt and/or participate in activities associated with the hunt, such as harvest-related celebrations. The number of whale hunts portrayed in the media would also likely increase, increasing the interest in the Makah Reservation as a cultural tourism destination. In addition, because hunts would likely occur during the summer when visitation by tourists to the Olympic Peninsula is comparatively higher than April and May (when hunting would likely occur under Alternative 2), this could further increase business activity for tourist-related enterprises in and around the project area.

4.6.3.3.2 <u>Household Use of Whale Products</u>

Compared to the No-action Alternative (under which no whales could be harvested and the Tribe would have access only to drift whales or whales incidentally caught in fishing gear) up to five whales annually could be harvested, with an average annual harvest of four whales allowed. No limits would be placed on the harvest of identified whales, and no limits would be placed on the hunting season. Hunting would likely occur year round. Under Alternative 3 the amount of whale products available for household consumption, manufacturing, and selling of traditional handicrafts would increase over current conditions (the No-action Alternative). The increase would come from whales the Tribe was actually able to harvest, which would likely be four whales annually, on average. The lack of limits on harvest of identified whales and hunting seasons would make it likely the Tribe could harvest the full number allowed.

Compared to Alternative 2, the lack of restrictions on the harvest of identified whales and the lack of restrictions on hunting seasons would increase the Tribe's ability to harvest the full number of whales. Consequently, the potential for whale products to be available for household consumption and the making and selling of traditional handicraft articles would likely be higher than under Alternative 2. The potential increase in income for households that participate in the making and selling of such articles would likewise be higher.

4.6.3.3.3 <u>Whale-watching Industry</u>

Compared to the No-action Alternative (under which no whales would be struck, exposed to harpoon attempts, or approached by hunters), under Alternative 3, up to seven whales may be struck annually, 28 exposed to unsuccessful harpoon attempts, and 140 approached. No limits would be placed on the harvest of identified whales or hunting seasons.

As described in Section 4.6.2.3, Whale-watching Industry, there is no information to suggest individuals would avoid whale-watching tours if a Makah hunt is authorized, and it is unlikely that Makah hunting activities would overlap geographically with whale-watching tours. It is also unlikely that gray whales would respond to a Makah tribal hunt by avoiding whale-watching vessels. As described in Section 4.5, Other Wildlife, it is likely that any effects of a hunt on other marine mammals, which might be a target of whale-watching operators, would be localized and temporary. To the extent such an effect might occur under Alternative 3, it is not possible to estimate the amount of decrease that might occur in revenues of whale-watching operators. Current revenues of whale-watching operators are unknown, and there is no information available or that could be obtained that would allow an estimation of how much revenues might decrease if ENP gray whale behavior were altered by a Makah hunt.

The number of whales allowed to be harvested or struck under Alternative 3 would be the same as under Alternative 2. However, the lack of restrictions on the hunting season and the harvest of identified whales would make it more likely the Tribe could harvest the full number of whales allowed. Therefore, the potential for a change in revenues of whale-watching operators, compared to the No-action Alternative, could be somewhat higher than the potential described under Alternative 2.

4.6.3.3.4 Shipping and Ocean Sport/Commercial Fishing

Compared to the No-action Alternative (under which there would be no whale hunts and no activation of the MEZ) activation of the MEZ on 40 days during a whale hunt under Alternative 3 would lead to an increased potential for restrictions on the movement of commercial shipping traffic and sport and commercial fisheries. However, the small size and duration of the MEZ would make it likely that restrictions on vessel movement or fishing operations caused by activation of the MEZ would be negligible. Further, as described in Section 4.13.2.2, Marine Traffic, hunt-related activities would most likely not interfere with commercial shipping traffic because most, if not all, hunting would probably occur within the Coast Guard RNA, which lies almost entirely within the OCNMS area to be avoided. Consequently, only minor economic impacts to commercial shipping or sport and commercial fisheries would be expected as a result of implementing Alternative 3.

Compared to Alternative 2, the additional days of hunting (40 versus 7-30) would result in more instances of the MEZ being activated. This would increase the potential for whale hunting to interfere with commercial shipping or sport and commercial fishing operations beyond the potential under Alternative 2. In addition, under Alternative 3, hunting could occur year round, compared to Alternative 2, which would restrict hunting to the period from December 1 through May 31, with most hunting likely occurring in April and May. Although commercial shipping and fishing occur year round, sport fishing is more likely to occur during summer months, particularly sport fishing vessels departing from Neah Bay. Thus for hunting that occurs after June 1 under

Alternative 3, there is a greater potential for activation of the MEZ to interfere with sport fishing, compared to the interference likely on a day of hunting under Alternative 2.

4.6.3.3.5 Management and Law Enforcement

Compared to the No-action Alternative (under which no whale-hunting or associated protests would occur) Alternative 3 could result in 40 days of hunting and associated protests. The amount of increase in costs for hunt observers and law enforcement would increase over current conditions by the number of days of hunting. It is uncertain whether the existing photo-identification study would continue to be funded under the No-action Alternative. If not, then its continuation under Alternative 3 would represent an increased cost beyond current conditions.

Under Alternative 3, costs would be incurred for NMFS and Makah observers during the 40 days that hunting occurred, resulting in an increase in costs over current conditions (the No-action Alternative). Estimated costs for a NMFS observer for 40 days of hunting could be as high as $42,000 (based on rate of $7,000 per month over a span of six months) (NMFS 2008).

If whale hunting by the Tribe engenders protests by whaling opponents, as it has in the past, there could also be costs associated with law enforcement activities. It is not possible to predict how many of the 40 days of hunting likely under Alternative 3 would require a law enforcement presence, or which governmental entities would provide law enforcement (federal, state, local and tribal). As described under Section 4.6.2.5, Management and Law Enforcement, estimated costs for all non-tribal enforcement agencies could approach $43,000 per day, with overall costs estimated at $2.1 million. As with the other alternatives, the bulk of costs would be associated with United States Coast Guard aircraft and vessels (NMFS 2008; Table 4-3). Compared to Alternative 2, these costs would be greater because of the potentially greater time span allowed for hunting.

4.6.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2 and would impose the same restrictions on the hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to influence the number of days of hunting, the number of whales struck or harvested, or the number of whales exposed to harpoon attempts or approaches. Therefore, Alternative 4 has the same potential as Alternative 2 to result in a change in revenue, employment, and/or economic value, relative to the No-action Alternative, associated with (1) tourist-related business activity, (2) household consumption and manufacture and sale of traditional handicrafts, (3) the whale-watching industry, (4) commercial shipping, sport/commercial fishing, and (5) hunt-related management and law enforcement.

4.6.3.5 Alternative 5

Under Alternative 5, hunting would be expected to occur on a total of 20 days year round. The limit on the number of struck whales would be three and the limit on the number of harvested whales would be two in any one year. Approximately 12 whales would be exposed to harpoon attempts and 60 would be approached annually. Compared to the No-action Alternative, under which there would be no hunting, Alternative 5 is likely to result in (1) minor short-term increases in tourism from the likely 20 days of hunting, (2) an increase of up to 2 whales annually available for household use by Makah tribal members, (3) negligible changes in whale-watching revenues due to changes in whale behavior as a result of interactions between hunters with whales, (4) minor increases in interference with shipping and sport/commercial fishing vessels, and (5) an increase in expenditures for management and law enforcement over the likely 20 days of hunting.

4.6.3.5.1 Tourism

Compared to the No-action Alternative (under which no whale hunts would occur to draw visitors to the project area), the whale hunt and associated activities under Alternative 5 would likely draw visitors to the project area on the days that hunting occurred, potentially creating a minor increase during those days in the level of business activity for tourist-related enterprises nearby. The increased business activity would likely be short term (lasting only as long as the hunt), as visitors would come to observe the hunt and to participate in harvest-related celebrations. Thus potential increases in business activity under Alternative 5 would likely occur on a total of 20 days. Because there would be no limits on the hunting season, hunting would likely occur year round, including during the summer period. Thus inclement weather would not be likely to deter visitors from coming to observe whale hunts. It is uncertain whether a hunt would result in a long-term increase in tourism over current conditions under the No-action Alternative. Publicity about the whale hunt could generate interest in the Makah Reservation as a cultural tourism destination, while some individuals might not visit the project area due to negative publicity about the whale hunt.

Compared to Alternative 2, there would be about the same number of days of hunting under Alternative 5 (20 versus 7 to 30), but they would likely occur during the summer, compared with April and May under Alternative 2. More visitors are likely to come observe a hunt during summer months, when weather conditions are more favorable. Thus it is likely that more visitors would come to observe the hunts under Alternative 5 than Alternative 2, with an attendant potential minor increase in business activity for tourist-related enterprises.

4.6.3.5.2 Household Use of Whale Products

Compared to the No-action Alternative (under which no whales could be harvested and the Tribe would have access only to drift whales or whales incidentally caught in fishing gear) up to two whales annually could be harvested annually under Alternative 5. No limits would be placed on the harvest of identified whales, and no limits would be placed on the hunting season. Hunting would likely occur year round.

Under Alternative 5 the amount of whale products available for household consumption, manufacturing, and selling of traditional handicrafts would increase over current conditions (the No-action Alternative). The increase would come from whales the Tribe was actually able to harvest, which would likely be two whales annually. The lack of limits on harvest of identified whales and hunting seasons, and the relatively low harvest level, would make it likely the Tribe could harvest the full number allowed.

Compared to Alternatives 2, 3, and 4, the lower number of whales that may be harvested (two per year versus an average of four per year) is likely to result in fewer whale products being available for household consumption and the making and selling of traditional handicraft. The potential increase in income for households that participate in the making and selling of such articles would likewise be lower.

4.6.3.5.3 Whale-watching Industry

Compared to the No-action Alternative (under which no hunts would occur and no whales would be struck, exposed to harpoon attempts, or approached by hunters), under Alternative 5, there may be 20 days of hunting, up to three whales may be struck annually, up to 12 whales may be exposed to unsuccessful harpoon attempts, and up to 60 whales may be approached.

As described above (Section 4.6.2.3, Whale-watching Industry) there is no information to suggest that individuals would avoid whale-watching tours if a Makah hunt were authorized, and it is unlikely that Makah hunting activities would overlap geographically with whale-watching tours. It is also unlikely that gray whales would respond to a Makah tribal hunt by avoiding whale-watching vessels. As described in Section 4.5, Other Wildlife, it is likely that any effects of a hunt on other marine mammals, which might be a target of whale-watching operators, would be localized and temporary. To the extent such an effect might occur under Alternative 5, it is not possible to estimate the amount of decrease that might occur in revenues or employment associated with whale-watching. Current revenues and employment in whale-watching operations are unknown, and there is no information available or that could be obtained that would allow an estimation of how much revenues might decrease if ENP gray whale behavior were altered by a Makah hunt.

Compared to Alternatives 2, 3, and 4, fewer whales could be harvested (two versus four per year), struck (three versus seven per year), exposed to harpoon attempts (12 versus 28) and approaches (60 versus 140). Therefore, the potential for interactions between hunting and whale-watching, or for whale-hunting to affect whale behavior around whale-watching vessels, is less than under Alternatives 2, 3, or 4.

4.6.3.5.4 Shipping and Ocean Sport/Commercial Fishing

Compared to the No-action Alternative (under which there would be no whale hunts and no activation of the MEZ) activation of the MEZ on 20 days of whale hunting under Alternative 5 would lead to an increased potential for restrictions on the movement of commercial shipping traffic and sport and commercial fisheries. However, the small size and duration of the MEZ would make it likely that restrictions on vessel movement or fishing operations caused by activation of the MEZ would be negligible. Any resulting economic effects on commercial shipping or sport and commercial fishing operations would also likely be negligible. In addition, hunt-related activities would most likely not interfere with commercial shipping traffic because most, if not all, hunting would probably occur within the Coast Guard RNA, which lies almost entirely within the OCNMS area to be avoided (Section 4.13.2.2, Marine Traffic). Consequently, only minor economic impacts to commercial shipping or sport and commercial fisheries would be expected as a result of implementing Alternative 5.

Compared to Alternatives 2 and 4, there would be about the same number of days of hunting (20 versus 7 to 30), likely resulting in about the same number of instances of the MEZ being activated. Thus there would be about the same potential for whale hunting to interfere with commercial shipping or sport and commercial fishing operations under Alternative 5 as under Alternatives 2 and 4. Because hunting would be allowed year round and would likely occur in the summer under Alternative 5, there is greater potential for a given instance of activating the MEZ to interfere with sport salmon fishing. Thus Alternative 5 could have a slightly greater potential to affect sport salmon fishing.

Compared to Alternative 3, Alternative 5 would result in fewer days of hunting (20 versus 40) and fewer instances of the MEZ being activated. Hunting under both alternatives would be allowed year round and would likely occur in the summer so there would not be a difference between the two alternatives for each instance of the MEZ being activated. For these reasons, there would be a lower potential for whale hunting to interfere with commercial shipping or sport and commercial fishing operations under Alternative 5 as under Alternative 3.

4.6.3.5.5 Management and Law Enforcement

Compared to the No-action Alternative (under which no whale-hunting or associated protests would occur) Alternative 5 could result in 20 days of hunting and associated protests. The amount of increase in costs for hunt observers and law enforcement would increase over current conditions by the number of days of hunting. It is uncertain whether the existing photo-identification study would continue to be funded under the No-action Alternative. If not, then its continuation under Alternative 5 would represent an increased cost beyond current conditions.

Under Alternative 5, costs would be incurred for NMFS and Makah observers during the 20 days that hunting occurred, resulting in an increase in costs over current conditions (the No-action Alternative). Estimated costs for a NMFS observer for 20 days could be as high as $42,000 (based on rate of $7,000 per month over a span of six months) (NMFS 2008).

If whale hunting by the Tribe engenders protests by whaling opponents, as it has in the past, there could also be costs associated with law enforcement activities. It is not possible to predict how many of the 20 days of hunting likely under Alternative 5 would require a law enforcement presence, or which governmental entities would provide law enforcement (federal, state, local and tribal). As described under Section 4.6.2.5, Management and Law Enforcement, estimated costs for all non-tribal enforcement agencies could approach $43,000 per day, with overall costs estimated at $1 million (Table 4-3). As with the other alternatives, the bulk of costs would be associated with United States Coast Guard aircraft and vessels (NMFS 2008). Compared to Alternatives 2 and 4, costs for management and law enforcement would be about the same because the number of days of hunting would be about the same (20 days versus 7 to 30). Compared to Alternative 3, costs would be less (approximately half) under Alternative 5 because fewer hunting days are expected (NMFS 2008).

4.6.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunting days year round as Alternative 3, the same number of whales harvested, struck, exposed to harpoon attempts and approaches, and the same number of instances of the MEZ being activated. Therefore, Alternative 6 has the same potential as Alternative 3 to result in a change in revenue, employment, and/or economic value, relative to the No-action Alternative, associated with (1) tourist-related business activity, (2) household consumption and manufacture and sale of traditional handicrafts, (3) the whale-watching industry, and (4) hunt-related management and law enforcement.

Regarding shipping and fishing, the ability to hunt in the Strait of Juan de Fuca could result in activation of the MEZ in the Strait (although current Coast Guard regulations regarding an MEZ for a Makah gray whale hunt do not extend into the strait). As described in Section 4.6.2.4, Shipping and Ocean Sport/Commercial Fishing, any effects on vessel movements are expected to be negligible. The potential for the MEZ to be activated in the strait under Alternative 6 would not be expected to result in different effects on shipping and fishing activities than would occur under Alternative 3. Therefore, Alternative 4 has the same potential as Alternative 2 to result in a change in revenue, employment, and/or economic value, relative to the No-action Alternative, associated with shipping or fishing.

TABLE 4-3. ESTIMATED COSTS OF ENFORCEMENT-RELATED ACTIVITIES AND RESOURCES

Entity	Unit Cost	No-action Alternative		Alternatives 2 & 4		Alternatives 3 & 6		Alternative 5	
		Freq.	Cost	Freq.	Cost	Freq.	Cost	Freq.	Cost
U.S. Coast Guard	$55,544 per day	*	*	7-30 days	$277,172 - $1,187,880	40 days	$1,583,840	20 days	$791,920
Washington State Patrol	$1,072 per day	*	*	60 days	$64,320	120 days	$128,640	30 days	$32,160
Clallam County Sheriff	$1,640 per day	*	*	60 days	$98,400	120 days	$196,800	30 days	$49,200
NMFS Enforcement (Variable)	$680 per day	*	*	7-60 days	$4,760 - 20,400	56 days	$38,080	28 days	$19,040
NMFS Enforcement (Fixed) & Compliance Monitoring	$9,790 per month	*	*	2 months	$19,580	6 months	$58,740	6 months	$58,740
NMFS Gray Whale Monitoring	$65,000 per year	*	*	Annual	$65,000	Annual	$65,000	Annual	$65,000
Total Costs		*		**$529,232 - $1,455,580**		**$2,071,100**		**$1,016,060**	

Freq. = Frequency

* Assumes no change from existing costs.

4.7 Environmental Justice

4.7.1 Introduction

Executive Order 12898, *Environmental Justice*, requires that federal agencies "identify and address the . . . disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Based on assessment of the demographic data presented in Section 3.7, Environmental Justice, and preliminary analysis of the type and location of effects potentially resulting from the proposed action, the potential population of concern for this environmental justice analysis consists of members of the Makah Tribe, which is a Native American population. As described in Section 3.7, Environmental Justice, this is a low-income, as well as a minority, population.

4.7.2 Evaluation Criteria

The EPA Office of Civil Rights and Environmental Justice developed guidance for all federal agencies conducting environmental justice analyses. This environmental justice analysis follows the EPA guidelines, which offer a range of categories to indicate the presence or absence of environmental justice effects (EPA 1998).This evaluation draws topically from the range of indicator categories EPA (1998) outlined. These categories correspond to effects described in Section 4.6, Economics, Section 4.8, Social Environment, and Section 4.10, Ceremonial and Subsistence Resources, of this EIS. The EPA environmental justice guidelines also indicate that impacts on human health should be considered in environmental justice analyses. As discussed in Section 4.16, Human Health, available information is insufficient to assess the potential of any of the alternatives to affect human health, either positively or negatively.

Analyses in this section also do not address the potential for the alternatives to affect the safety of Makah tribal members because environmental justice contemplates impacts imposed on minority and low-income populations by a federal agency. The proposed action is based on the Tribe's MMPA waiver request and the other action alternatives include variations on the restrictions identified in the Tribe's request. Risks associated with whale hunting would be undertaken voluntarily by the Tribe. The safety of hunt participants and others is addressed in Section 4.15, Public Safety. Authorization of a whale hunt under the action alternatives would likely result in some level of whale hunting activity by Makah tribal members, increasing the potential for hunt-related injury above the current level of injury under the No-action Alternative.

This analysis was based on a qualitative assessment of adverse effects that would result from the proposed alternatives for each of the three resource areas evaluated. A determination of an environmental justice impact would occur if these adverse effects were to have a disproportionate effect on the environmental justice population of concern. A disproportionately high and adverse effect on minority and low-income populations means an adverse effect that (1) is predominantly borne by a minority population and/or a low-income population; or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non low-income population.

4.7.3 Evaluation of Alternatives

The following sections compare the potential for the alternatives to affect economic conditions in the project area. For each alternative, the discussion addresses the potential economic; ceremonial and subsistence resources; social environment; and human health effects on the Makah Tribe and other low-income or minority populations.

Business activity at tourist-related enterprises in Neah Bay generates jobs and income for tribal members (Section 3.6.3.2.4, Contribution of Tourism to the Local Economy). As described in Section 4.6.2.1, Tourism, whale hunts may create short-term increases in tourist-related business activity during a whale hunt. A whale hunt may also create an opportunity over the long term for the Tribe to attract visitors to Neah Bay who are interested in observing traditional cultural activities. On the other hand, hunting could also lead to boycott attempts by whale-hunting opponents, which could reduce the number of visitors to Neah Bay. If, on balance, the absence of a whale hunt resulted in less tourism-related business activity in Neah Bay (compared to under the action alternatives), a disproportionate share of the adverse economic effects might fall on the Makah Tribe.

Potential short-term increases in business activity for tourist-related enterprises on the Makah Reservation would likely be lower under Alternatives 2 and 4 compared to Alternatives 3 and 6 because hunting would be limited to winter periods under Alternatives 2 and 4, when visits to the Olympic Peninsula by tourists are relatively lower. Potential tourism benefits to the Tribe under Alternative 5 would probably be lower than under Alternatives 3 and 6, because there would likely be fewer days of hunting (20 versus 40). Potential tourism benefits to the Tribe under Alternative 5 would probably be slightly higher than under Alternatives 2 and 4, because the number of days of hunting would be about the same (20 versus 7 to 30), but hunting days would likely occur during a period of better weather and greater tourist activity. Regarding the Tribe's ability to attract more visitors over the longer term because of a hunt, all of the action alternatives are likely to have an equal effect, compared to the No-action Alternative.

Under the No-action Alternative, no freshly harvested whale products would be available to Makah households. The quantity of whale products available to Makah households for consumption and making and selling handicraft articles would be limited to drift whales or whales taken incidentally in fisheries. A disproportionate share of these adverse effects would fall upon the Makah Tribe, which would have been the primary users of such products. Lack of such product would make largely unavailable a traditional subsistence resource for household members and the Makah community as a whole.

The potential for edible and non-edible whale products to become available would probably be lower under Alternatives 2 and 4 than Alternatives 3 and 6 because weather and other logistical considerations related to the timing of the hunt might constrain the Tribe's ability to reach the full limit on the number of whales allowed for harvested in any given year. The potential for whale products to become available under Alternative 5 would be lower under the other Alternatives because of the lower limit on the number of whales that may be harvested.

Under the No-action Alternative, subsistence and cultural activities related to whale hunting (e.g., preparation, hunting, butchering, sharing, consuming, dancing, singing, and rituals) would be more limited than under the action alternatives. A disproportionate share of the adverse effects on subsistence uses, traditional knowledge and activities, spiritual connection to whale hunting, and cultural identity would fall upon the Makah Tribe. The Makah's stated need for the whale hunt is to allow the Tribe to exercise its treaty whale hunting rights to provide a traditional subsistence resource to the community and to sustain and revitalize the ceremonial, cultural, and social aspects of its whale hunting traditions. Alternatives 2, 4, and 5 would have the positive ceremonial and subsistence effects associated with a resumption of Makah whale hunting, but would restrict whale hunting in various ways that might make these benefits lower than under Alternatives 3 and 6.

Under the No-action Alternative, the benefits to the social environment (for example, community cohesion) that the Makah Tribe attributes to whale hunting would not be realized, potentially increasing social tension within the Makah Tribe. To the extent they occurred, these adverse social impacts would be borne predominantly by Makah Tribe members. Other treaty tribes could view NMFS' action under the No-action Alternative as a breach of faith by the United States government in upholding treaty rights, depending on the reasons for the denial of the request.

Any social tension created by this perception would not fall equally on all populations, but would predominantly be borne by Native Americans. Under any of the action alternatives, the social benefits that the Makah Tribe attributes to whale hunting would be realized; however, whale hunts would also probably exacerbate the social tensions between Tribe members who do and those who do not support the hunt. There is insufficient information to determine whether the potential social benefits to the Makah Tribe would offset the potential adverse social effects. Consequently, it is not possible to determine if the action alternatives would result in disproportionately high and adverse social effects on the Makah Tribe. Under any of the action alternatives, official recognition that traditional activities such as whale hunting are culturally valuable, despite their controversial nature, could be reassuring to Native Americans in general.

4.7.3.1 Alternative 1

4.7.3.1.1 Economics

Under the No-action Alternative, no whale hunt would be permitted, and there would be no short-term increases in business activity as visitors come to Neah Bay to view hunt-related activities or to participate in harvest-related celebrations. In addition, there be no potential for media coverage of the whale hunt to generate interest in the Makah Reservation as a cultural tourism destination. As a result, this alternative might limit the long-term opportunities for the Makah to expand the tribal tourism sector of the reservation economy. On the other hand, under the No-action Alternative it is unlikely there would be attempts to boycott Neah Bay because of whale hunting. If, on balance, the absence of a whale hunt under the No-action Alternative resulted in less tourism-related business activity in Neah Bay (compared to under the action alternatives), a disproportionate share of these adverse effects might fall on the Makah Tribe.

With the possible exception of products from drift whales or whales incidentally caught in fisheries, there would be no potential for households to consume whale meat and blubber or use non-edible whale products for the manufacture and sale of traditional handicrafts. The potential for households to gain additional income from making and selling traditional handicrafts would not be realized. As noted in Section 3.7.3.3.3, Makah Tribe, Native Americans living on the Makah Reservation have substantially lower incomes and experience higher poverty rates than residents throughout Clallam County. The adverse impact of this unrealized household income would be borne predominantly by Makah households. The Makah households would principally use the whale products to provide a traditional subsistence resource to household members and the wider Makah community and to derive income from the manufacture and sale of traditional native handicrafts.

4.7.3.1.2 Ceremonial and Subsistence Resources

Under the No-action Alternative, some subsistence and cultural activities related to whale hunting (e.g., preparation, hunting, butchering, sharing, consuming, dancing, singing, and rituals) would not be expected to occur. A disproportionate share of the adverse effects on subsistence uses, traditional knowledge and activities, and spiritual connection to whale hunting, and cultural identity would fall upon the Makah Tribe. The Makah's stated need for the whale hunt is to allow the Tribe to exercise treaty whale hunting rights to provide a traditional subsistence resource to the community and to sustain and revitalize the ceremonial, cultural, and social aspects of its whale hunting traditions.

4.7.3.1.3 Social Environment

Under the No-action Alternative, the benefits to the social environment (for example, community cohesion) that the Makah Tribe attributes to whale hunting would not be realized, potentially increasing social tension within the Makah Tribe. To the extent that they would occur, these adverse social impacts would be borne predominantly by members of the Makah Tribe.

The No-action Alternative could also create social tensions between the Makah Tribe and other social groups, or between Native Americans generally and other social groups. The social tension created by this perception would not fall equally on all populations, but would predominantly be borne by Native American populations.

4.7.3.2 Alternative 2

4.7.3.2.1 Economics

In comparison to the No-action Alternative, there could be a minor increase in the level of business activities of tourist-related enterprises in and around the project area. Over the longer term, the Tribe would have opportunities to bolster the tribal tourism sector of the reservation economy, as media stories would increase public awareness of the Makah whale hunt and the Tribe's whale hunting tradition. Boycott attempts, however, could reduce any long term benefits from tourism.

Compared to the No-action Alternative, the potential for whale products to become available to Makah households for consumption and the making and selling of handicraft articles would increase as a result of the resumption of Makah whale hunting. The increased potential for whale products to become available for household consumption and the making and selling of traditional handicraft articles would have a beneficial effect on Makah households.

4.7.3.2.2 <u>Ceremonial and Subsistence and Resources</u>

In contrast to the No-action Alternative, Alternative 2 would have multiple positive ceremonial and subsistence effects on the Makah Tribe associated with a resumption of whale hunting. Alternative 2, like the other action alternatives, would be consistent with the Makah's stated need for the whale hunt, which is to allow the Tribe to exercise its treaty whale hunting rights to provide a traditional subsistence resource to the community and to sustain and revitalize the ceremonial, cultural, and social aspects of its whale hunting traditions.

4.7.3.2.3 <u>Social Environment</u>

In contrast to the No-action Alternative, the benefits to the social environment (for example, increased increase social bonding within the Makah Tribe) that the Tribe attributes to whale hunting would be realized. However, social tensions exist between tribal members who support the hunt and those who do not. Whale hunts under Alternative 2 would probably exacerbate these tensions. There is insufficient information to determine whether the potential social benefits to the Makah Tribe would offset the potential adverse social effects. Consequently, it is impossible to determine if Alternative 2 would result in disproportionately high and adverse social effects.

Alternative 2 would make it possible for the Tribe to carry on traditional whale hunting that is sanctioned by the IWC. In contrast to the No-action Alternative, official recognition that traditional activities such as whale hunting are culturally valuable, despite their controversial nature, would likely be reassuring to Native Americans in general.

4.7.3.3 Alternative 3

4.7.3.3.1 <u>Economics</u>

In comparison to the No-action Alternative, there could be a minor increase in the level of business activities of tourist-related enterprises in and around the project area. Over the longer term, the Tribe would have opportunities to bolster the tribal tourism sector of the reservation economy, as media stories would increase public awareness of the Makah whale hunt and the Tribe's whale hunting tradition. Boycott attempts, however, could reduce any long term benefits from tourism.

Compared to the No-action Alternative, the potential for whale products to become available to Makah households for consumption and the making and selling of handicraft articles would increase as a result of the resumption of Makah whale hunting. The increased potential for whale products to become available for household consumption and the making and selling of traditional handicraft articles would have a beneficial effect on Makah households.

Compared to Alternative 2, Alternative 3 would afford more days of hunting (40 versus 7-30) on which there could be increased business activity caused by an influx of visitors. The ability to hunt year round and the lack of limits on identified whales would make it more likely the Tribe could harvest the full number of whales under Alternative 3, thus more whale products would be available for consumption and the production of handicrafts.

4.7.3.3.2 Ceremonial and Subsistence Resources

In contrast to the No-action Alternative, Alternative 3 would have multiple positive ceremonial and subsistence effects on the Makah Tribe associated with a resumption of whale hunting. Alternative 3, like the other action alternatives, would be consistent with the Makah's stated need for the whale hunt, which is to allow the Tribe to exercise its treaty whale hunting rights to provide a traditional subsistence resource to the community and to sustain and revitalize the ceremonial, cultural, and social aspects of its whale hunting traditions.

Compared to Alternative 2, the ability to hunt year round would increase the opportunities for hunting whales and for resident participation. Consequently, the positive ceremonial and subsistence effects that the Makah would experience as a result of a resumption of whale hunting would be greater under Alternative 3 than under Alternative 2. Alternative 3, like the other action alternatives, would be consistent with the Makah's stated need for the whale hunt.

4.7.3.3.3 Social Environment

In contrast to the No-action Alternative, the benefits to the social environment (for example, increased increase social bonding within the Makah Tribe) that the Tribe attributes to whale hunting would be realized. However, social tensions exist between tribal members who support the hunt and those who do not. Whale hunts under Alternative 3 would probably exacerbate these tensions. There is insufficient information to determine whether the potential social benefits to the Makah Tribe would offset the potential adverse social effects. Consequently, it is impossible to determine if Alternative 3 would result in disproportionately high and adverse social effects.

Alternative 3 would make it possible for the Tribe to carry on traditional whale hunting that is sanctioned by the IWC. In contrast to the No-action Alternative, official recognition that traditional activities such as whale hunting are culturally valuable, despite their controversial nature, would likely be reassuring to Native Americans in general.

The amount of social benefit the Makah Tribe experiences under Alternative 3 would probably be the same as under Alternative 2.

4.7.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2 and would impose the same restrictions on the hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to influence the number of days of hunting or the number of whales struck or harvested. Therefore, Alternative 4 has the same potential as Alternative 2 to result in a change in the economic circumstances, ceremonial and subsistence resources, or social environment of the Makah Tribe.

4.7.3.5 Alternative 5

4.7.3.5.1 Economics

In comparison to the No-action Alternative, there could be a minor increase in the level of business activities of tourist-related enterprises in and around the project area. Over the longer term, the Tribe would have opportunities to bolster the tribal tourism sector of the reservation economy, as media stories would increase public awareness of the Makah whale hunt and the Tribe's whale hunting tradition. Boycott attempts, however, could reduce any long term benefits from tourism.

Compared to the No-action Alternative, the potential for whale products to become available to Makah households for consumption and the making and selling of handicraft articles would increase as a result of the resumption of Makah whale hunting. The increased potential for whale products to become available for household consumption and the making and selling of traditional handicraft articles would have a beneficial effect on Makah households.

Compared to Alternatives 2 and 4, Alternative 5 would afford about the same number of days hunting (20 versus 7 to 30) on which there could be increased business activity caused by an influx of visitors. The lower limits on harvest whales (three versus five) would result in fewer whale products being available for Makah households. Compared to Alternative 3, Alternative 5 would afford fewer days of hunting (20 versus 40) and therefore fewer days of increased business activity.

4.7.3.5.2 Ceremonial and Subsistence Resources

In contrast to the No-action Alternative, Alternative 5 would have multiple positive ceremonial and subsistence effects on the Makah Tribe associated with a resumption of whale hunting. Alternative 3, like the other action alternatives, would be consistent with the Makah's stated need for the whale hunt, which is to allow the Tribe to exercise its treaty whale hunting rights to provide a traditional subsistence resource to the community and to sustain and revitalize the ceremonial, cultural, and social aspects of its whale hunting traditions.

Compared to Alternatives 2 and 4, the number of days of hunting would be about the same (20 versus 7 to 30), but the ability to hunt year round could increase the opportunities for hunting whales and for resident participation. Consequently, the positive ceremonial and subsistence effects that the Makah would experience as a result of a resumption of whale hunting could be greater than under Alternatives 2 and 4. Compared to Alternative 3, Alternative 5 would afford fewer days of hunting (20 versus 40) and therefore potentially fewer opportunities for resident participation and less subsistence/cultural satisfaction.

4.7.3.5.3 Social Environment

In contrast to the No-action Alternative, the benefits to the social environment (for example, increased increase social bonding within the Makah Tribe) that the Tribe attributes to whale hunting would be realized. However, social tensions exist between tribal members who support the hunt and those who do not. Whale hunts under Alternative 5 would probably exacerbate these tensions. There is insufficient information to determine whether the potential social benefits to the Makah Tribe would offset the potential adverse social effects. Consequently, it is impossible to determine if Alternative 5 would result in disproportionately high and adverse social effects.

Alternative 3 would make it possible for the Tribe to carry on traditional whale hunting that is sanctioned by the IWC. In contrast to the No-action Alternative, official recognition that traditional activities such as whale hunting are culturally valuable, despite their controversial nature, would likely be reassuring to Native Americans in general.

The amount of social benefit the Makah Tribe experiences under Alternative 5 would probably be the same as under Alternatives 2, 3, and 4.

4.7.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunting days year round as Alternative 3 and the same number of whales harvested. Therefore, Alternative 6 has the same potential as Alternative 3 to result in a change in the economic circumstances, ceremonial and subsistence resources, or social environment of the Makah Tribe.

4.8 Social Environment

4.8.1 Introduction

This section addresses the potential for the alternatives to affect the social environment of the Makah Tribe, other tribes, and the general public. As described in Section 3.8, Social Environment, various groups and individuals either oppose or support the Makah whale hunt. Makah tribal members and other tribes generally support the hunt, while feelings among the general public are more mixed. Many adamantly oppose the hunt. NMFS' denial of a whale hunt under the No-action Alternative could create tension on the part of the Makah and other Indian tribes toward whale hunting opponents and the federal government, depending on the reasons for a denial. Conversely, a decision to authorize a whale hunt, and subsequent hunting, could lead to tensions on the part of whale hunting opponents towards the Makah and other Indian tribes and the federal government. Regardless of the decision, like-minded groups could experience moments of increased social bonding.

4.8.2 Evaluation Criteria

Any of the alternatives could affect relationships and interactions among members of the Makah Tribe, other tribes, and the general public. These effects would be expressed to varying degrees as social tension or social bonding, depending on the feelings of individual group members about whale hunting. The criteria for determining the potential effects of the alternatives on the social environment are primarily qualitative, based on the anticipated magnitude and duration of changes in social tensions or social bonding. The amount and content of media coverage might intensify protests and local social tensions. The following three sections describe how social interactions within and among the three interest groups identified in Section 3.8, Social Environment, might be affected under the alternatives.

4.8.2.1 Makah Tribal Members

As noted in Section 3.10.3.5.1, Makah Whaling, the 1999 whale hunt appeared to bolster social accord within the Makah community. Participants in the hunt reported enduring intense physical and spiritual training, which culminated in a deep bond between whalers (Section 3.10.3.5, Contemporary Makah Society). More broadly, most tribal members believe that restoration of whale hunting improved social and cultural conditions on the reservation (Section 3.8.3.1, Makah tribal members). Based on these experiences, as well as the potential benefits associated with reinforcing cultural identity (Section 4.10, Ceremonial and Subsistence Resources), whale hunts under the action alternatives could increase social bonding within the Tribe. Conversely, a decision to deny the Tribe's request to hunt whales could lead to feelings of resentment toward the federal government by those tribal members who support the hunt, depending on the reason for the denial (Section 4.10.3.1, Ceremonial and Subsistence Resources – Alternative 1).

A whale hunt might also generate social tension between tribal members who support the hunt and those who do not. Whale hunts under the action alternatives would probably exacerbate tensions, which might be expressed as vocal dissent and public or private criticism of tribal members who speak out against the hunt.

Under the action alternatives, tension would also increase between tribal members who support the hunt and individuals or group members (including some members of other tribes) who oppose the hunt. As mentioned in Section 3.8.3.1, Makah Tribal Members, tribal members have expressed frustration with protesters and others who oppose the hunt, and some engaged in physical conflicts with protesters during the previous hunts.

4.8.2.2 Other Tribes

Many native organizations have expressed support for Makah whale hunting. In addition, some members of other regional tribes have stated the importance of solidarity with the Makah (Section 3.8.3.2, Other Tribes). Following the successful hunt in 1999, members of other tribes attended a community potlatch hosted by the Makah, witnessing the proceedings and sharing food. Whale hunts under the action alternatives would probably increase social bonding between the Makah and other native groups in the region, the United States, and worldwide. At the same time, members of other tribes might be subject to anti-whaling and anti-Indian sentiments expressed by whaling opponents. Similar to the Makah, other tribes might respond to the No-action Alternative with reinforced feelings of disillusionment with the federal government.

4.8.2.3 Other Individuals and Organizations

Section 3.8.3.3, Other Individuals and Organizations, describes the range of attitudes about Makah whale hunting held by people locally, statewide, nationally, and internationally, as well as people affiliated with various organizations. Those expressing support for the Makah gray whale hunt have mentioned treaty rights, the relative health of the gray whale population, and the cultural meaning ascribed to whaling by the Makah. Opponents of the hunt have commented on the beauty, intelligence, and community structure of whales, the existence value of gray whales (collectively and individually), the pain individual whales experience if struck or killed in a hunt, and the possibility that the local economy might be impacted by a boycott in response to a whale hunt. Organizations that oppose whaling in general include animal-rights and marine conservation organizations, the whale-watching industry, and anti-treaty constituents.

Based on the experience of previous hunts, whale hunting under the action alternatives would inspire a wide range of feelings among persons and groups who oppose the hunt, including sorrow, frustration, and anger (Section 3.8.3.3, Other Individuals and Organizations). These feelings would be based in the concerns listed above, among others. Experience from the hunts and hunt exercises in 1998, 1999, and 2000 indicates that the resulting tensions might be expressed through demonstrations, attempts to interfere with hunt activities, or other forms of protest. These expressions might be directed at Makah tribal members, other tribes, and other individuals and organization members who have expressed support for the Makah whale hunt. Several incidents involving violent or near-violent confrontations between hunt opponents and tribal members occurred before and during the previous hunts (Section 3.8.3.3, Other Individuals and Organizations). Other expressions of tension that followed the successful 1999 hunt included death threats and anti-whaling messages delivered to tribal members and the Coast Guard, as well as incidents of Makah tribal members being refused service in area businesses. Some expressions of social tension directed at the Makah are founded in racism and anti-Indian sentiment, as well as resentment over the previous whale hunts. Such expressions would likely continue under all of the alternatives, including the No-action Alternative.

A whale hunt could also increase social bonding among whaling opponents, through a sense of shared adversity and a common cause. Under the No-action Alternative, hunt opponents might bond by celebrating a decision not to issue a permit. Similarly, supporters of the Makah gray whale hunt may bond through celebration under the action alternatives and through shared frustration under the No-action Alternative.

4.8.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect the social environment of the Makah Tribe, other tribes, and the general public. Under the action alternatives, each hunt attempt would probably result in protests and media coverage, with the associated effects described above, under Section 4.8.2, Evaluation Criteria. Most protest activities and vocal opposition to the hunt have come from groups that have expressed opposition to whale hunting under any conditions. For example, the website of one of the most active protest organizations states, “Whales should not be slaughtered anytime or anywhere by any people. These are socially complex, intelligent mammals whose numbers worldwide have been diminished severely” (Sea

Shepherd Conservation Society 2007). It is possible that restrictions on the total number of whales harvested, or on the number of identified whales harvested, would reduce the amount and intensity of opposition to a hunt. There is information that would allow a prediction of the difference in social tensions under alternatives that would place limits on harvest of identified whales versus those that would not. This analysis therefore treats the potential type and magnitude of effects on the social environment as depending on whether hunting occurs, the number of hunting expeditions, and the amount and content of associated media coverage. Alternatives that include more hunting expeditions would provide opportunities for more expression of social tension among those with opposing viewpoints the hunt, as well as added opportunities for increased bonding among persons sharing similar viewpoints.

As noted in Section 3.8.3.3, Other Individuals and Organizations, many people who watch whales in the project area on a regular basis attach existence values to individual whales that have been identified through photo-identification studies. It is possible that these people may express greater opposition to alternatives that do not include limits on the number of photo-identified whales (Alternatives 3, 5, and 6), compared to alternatives that do (Alternatives 2 and 4).

The lowest risk of adverse effects on the social environment would occur under the No-action Alternative, because no whale hunts would be permitted and there would be fewer occasions for confrontation between supporters and opponents of whale hunting compared to any of the action alternatives. Under all of the action alternatives, whale hunts would result in episodes of increased social tension between hunt supporters and opponents. Each hunt would be expected to result in increased tension as well as increased opportunities for social bonding between like-minded observers, compared to the No-action Alternative. The number of occasions that social tensions would likely exceed conditions under the No-action Alternative would likely correspond to the number of days that hunting would occur under each alternative. As discussed in Section 4.1, Introduction, Alternatives 2 and 4 would likely result in 7 to 30 days of hunting, Alternative 5 would likely result in 20 days of hunting, and Alternatives 3 and 6 would likely result in as many as 40 days (Table 4-1). Among the action alternatives, therefore, Alternatives 2 and 4 would have the lowest risk of adverse effects on the social environment, Alternative 5 would have a moderate risk, and Alternatives 3 and 6 would have the greatest risk, based on the number of occasions of elevated tension due to whale hunting.

The alternative with the lowest potential of providing benefits to Makah tribal members through social bonding would be the No-action Alternative. Any of the action alternatives would provide some potential for benefits to tribal members through social bonding.

4.8.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted, and no whale hunting or associated activities (e.g., ceremonies, celebrations, protests, law enforcement) would be anticipated. Individuals and organizations who oppose the Makah gray whale hunt would not engage in demonstrations, attempts to interfere with hunt activities, or other forms of protest. There would, therefore, be no potential for episodes of increased social tensions associated with a whale hunt. Supporters of the Makah whale hunt might bond through a sense of shared adversity and a common cause, and hunt opponents (including some Makah tribal members) might bond by celebrating a decision not to authorize a hunt. Similarly, social bonding and other potential social benefits described above and in Chapter 3 would not be realized under the No-action Alternative. Renker (2007) cited observations of a connection between unhealthy social behaviors and the inability to practice traditional rituals. Such behaviors could become more common among Makah tribal members. In addition, the Makah and other tribes might feel continued tension toward hunt opponents and the federal government, due in part to anger over a perceived lack of respect for tribal traditions and treaty rights.

4.8.3.2 Alternative 2

Any whale hunts that occurred under Alternative 2 would result in increased tension between hunt supporters and opponents, compared to the No-action Alternative. As described under 4.8.3, Evaluation Criteria, the potential type and magnitude of effects on the social environment would likely be affected by the number of hunting expeditions. As described in Section 4.1, Introduction, there would likely be 7 to 30 days of hunting per year under Alternative 2. The degree of tension expressed by some hunt opponents might also be affected by the number of identified whales that could be killed. Alternative 2 would likely result in about one identified whales being killed each year.

Supporters and opponents would be drawn from all three of the interest groups (i.e., Makah tribal members, other tribes, and other individuals and organizations) described above and in Section 3.8.3, Existing Conditions. The reactions of individual members of interest groups would be determined primarily by each person’s set of values and beliefs. Members of specific organizations, which are generally made up of people who share similar values and beliefs, would likely express similar reactions. Members of local communities and Indian tribes (including the Makah) would be more likely to differ from one another, because those groups are based on cultural, geographical, or familial ties instead of particular belief systems.

Individuals and organizations who oppose the Makah gray whale hunt may engage in demonstrations, attempts to interfere with hunt activities, or other forms of protest. Some tribal members or other hunt supporters may engage in confrontations with protesters. Social tensions might be expressed as described above or in other ways.

4.8.3.3 Alternative 3

Any whale hunts that occurred under Alternative 3 would result in increased tension between hunt supporters and opponents, compared to the No-action Alternative. As described under Section 4.8.2, Evaluation Criteria, the potential type and magnitude of effects on the social environment would likely be affected by the number of hunting expeditions. As described in Section 4.1, Introduction, there would likely be 40 days of hunting per year under Alternative 3. This would create more opportunities for the expression of social tension than under Alternative 2, and more opportunities relative to the No-action Alternative. The degree of tension expressed by some hunt opponents might also be affected by the number of identified whales that could be killed. Alternative 3 could result in as many as seven identified whales being killed each year, which is seven times as many as would be likely under Alternative 2. Thus there would be a greater potential for social tension regarding killing identified whales than under Alternative 2, and greater potential relative to the No-action Alternative.

The types of reactions and social tensions would be similar to those described under Alternative 2 and in Section 4.8.2, Evaluation Criteria, but would likely occur with greater frequency under Alternative 3 because of the increased number of days of hunting. The social tensions also might be more intense because of the lack of limits on harvesting identified whales.

4.8.3.4 Alternative 4

Alternative 4 would likely result in the same number of days of hunting and the same harvest of identified whales as Alternative 2. Therefore, effects on the social environment under this alternative would be similar to those under Alternative 2, and the comparison to the No-action Alternative would be similar.

4.8.3.5 Alternative 5

Any whale hunts that occurred under Alternative 5 would result in increased tension between hunt supporters and opponents, compared to the No-action Alternative. As described under

Section 4.8.2, Evaluation Criteria, the potential type and magnitude of effects on the social environment would likely be affected by the number of hunting expeditions. As described in Section 4.1, Introduction, there would likely be 20 days of hunting per year under Alternative 5. This would create about the same number of opportunities for the expression of social tension as under Alternatives 2 and 4, fewer opportunities relative to Alternative 3, and more opportunities relative to the No-action Alternative. The degree of tension expressed by some hunt opponents might also be affected by the number of identified whales that could be killed. Alternative 5 could result in as many as three identified whales being killed each year, which is three times as many as would be likely under Alternative 2, but less than half as many as would be possible under Alternative 3. Thus there would be a greater potential for social tension regarding killing identified whales than under Alternative 2, a lesser potential relative to Alternative 3, and greater potential relative to the No-action Alternative.

4.8.3.6 Alternative 6

Alternative 6 would likely result in the same number of days of hunting and the same harvest of identified whales as Alternative 3. Therefore, effects on the social environment under this alternative would be similar to those under Alternative 3, and the comparison to the No-action Alternative would be similar.

4.9 Cultural Resources

This section addresses the potential for the alternatives to affect cultural resources in the project area, including historic sites, archaeological sites, and traditional cultural properties. The analysis considers the potential for whale hunting or related activities to affect physical sites with cultural significance. Ways in which hunt-related activities could affect cultural sites include physical damage from towing a whale to shore, or trampling of sensitive sites by persons observing or participating in a hunt or related activities. Potential effects on cultural practices and the cultural identity of the Makah Tribe are addressed in Section 4.10, Ceremonial and Subsistence Resources.

Three historic sites listed on the National Register of Historic Places occur in the waters or shoreline of the Makah U&A (Section 3.9.3.1, National Historical Register Sites). These are Quimper's Landing, Tatoosh Island, and the Wedding Rock Petroglyphs. Under the No-action Alternative, the potential for adverse effects on these sites would not differ from the potential under current conditions. There is a low risk of intentional or unintentional damage or disturbance by recreational users or other people in the areas where these sites occur.

It is improbable that any of these historic sites would be affected by activities directly related to harvesting a whale (such as towing the whale to shore, butchering, and transporting whale products from the landing site) under any of the action alternatives. Quimper's Landing is in the northeast waters/shore of Neah Bay and would not be affected by towing a whale to shore or landing it at Front Beach, which is at the opposite side of the bay. At Tatoosh Island, logistical challenges related to the transport of people, equipment, and butchered whale products make it unlikely that any whales would be landed at that site. In addition, the Tatoosh Island lighthouse is geographically separate from the rocky shore. Moreover, the island is owned by the Tribe and was traditionally used for landing whales, so few (if any) non-tribal onlookers would be present at the landing site and landing a whale there would be in keeping with Makah cultural tradition. The beach where the Wedding Rock Petroglyphs occur is a remote, off-reservation location that lacks vehicle access, making it an unlikely site for landing whales.

The potential for listed historic sites to be damaged by hunt observers or onlookers is also low. The only site where this could occur is the Wedding Rock Petroglyphs, because Quimper's Landing is in the water and access to Tatoosh Island is restricted by the Makah Tribe. Although it is unlikely that a whale would be landed at the beach where the Wedding Rock Petroglyphs are found, interested parties at certain vantage points along the access trail could view some hunt activities on the water. It is possible that persons viewing a whale hunt might accidentally tread or encroach upon an existing archaeological or historic site. Because many activities associated with whale hunting would occur in marine locations not visible from the shoreline, the possibility of such accidental harm to this site is remote. Any damage to the Wedding Rocks Petroglyphs from shore-based visitors would likely be unrelated to any whale-hunting activities.

Unlisted sites, such as the shell midden sites along eroding beach terraces in the Olympic National Park, are also unlikely to be affected for the reasons described above. Makah whalers would be most likely to choose a beach on reservation lands for landing a whale, to facilitate access for butchering and celebrations. Moreover, any whale that is landed and butchered would be close to the water's edge and not as far upland as the midden sites.

Many unlisted sacred sites on the Makah Reservation were traditionally used by Makah whalers and their families to prepare for whale hunting. Some ceremonial use of these sites would likely occur under the No-action Alternative, but the use would not necessarily be related to whale hunting. Under the action alternatives, the cultural value of these sacred sites would be enhanced by their use for whale hunting-related ceremonies. As noted in Section 3.9.3.3, Other Culturally

Important Sites, the only traditional cultural property identified for this analysis is First Beach. Under the No-action Alternative, this site would not be used for any practices directly related to whale hunting. Use of this site for butchering whales under the action alternatives would be consistent with its traditional use by the Makah.

4.10 Ceremonial and Subsistence Resources

4.10.1 Introduction

This section addresses the potential for the alternatives to affect the Makah Tribe's efforts to revive ceremonial and subsistence practices associated with hunting and using whales, which in turn affect Makah culture. The Makah Tribe has a long history of hunting whales (Section 3.10.3.4, Makah Historic Whaling), as well as culturally significant treaty language reserving the right to hunt whales. Despite a more than 70-year hiatus in hunting whales before the 1999 and 2000 hunts, the Makah have maintained a close cultural and ceremonial association to this traditional activity. Makah ceremonial and subsistence practices associated with whale hunting undertaken by some members include preparation for the hunt, the hunt itself, processing and distribution of the products, and consumption of products from the hunt (Section 3.10.3.5.1, Makah Whaling). Also important is the satisfaction many tribal members derive from harvesting, preparing, sharing and eating traditional food; practicing traditional activities and applying and transmitting traditional knowledge; participating in ceremonial practices and spiritual connections associated with whales and whale hunting; and reinforcing cultural identity associated with the whale hunt and related activities (Section 3.10.3.5.1, Makah Whaling).

Persons whose ceremonial and subsistence practices could be affected by the alternatives include residents of the Makah Reservation, members of the Tribe who live elsewhere, nearby treaty tribes, and more widespread indigenous people. Makah tribal members who live off the reservation could be affected because strong kinship and cultural ties extend beyond the reservation's boundaries. Non-Makah tribes and other indigenous people could be affected due to the close social and cultural ties among indigenous people (Section 3.8.3.2, Other Tribes).

Potential effects of the alternatives on archaeological resources associated with whale hunting are addressed in Section 4.9, Cultural Resources. Potential effects on the exercise of ceremonial and subsistence practices of indigenous people worldwide (by influencing the behavior of other countries toward indigenous people within their borders) are addressed in Section 4.17, National and International Regulatory Environment.

4.10.2 Evaluation Criteria

Several criteria were used to determine the potential effects of the alternatives on the Tribe's the ceremonial and subsistence practices related to whale hunting and the subsistence use of whales. They can be grouped into four categories: (1) subsistence use, (2) traditional knowledge and activities, (3) spiritual connection to whale hunting, and (4) cultural identity. The following four sections describe these categories in greater detail, and subsequent sections discuss the effects of each alternative on these aspects of ceremonial and subsistence practices. All of the alternatives have the potential to affect the Tribe's ceremonial and subsistence practices and Makah culture (Braund et al. 2007).

4.10.2.1 Subsistence Use

Subsistence use includes, among other things, harvesting, processing, sharing and consuming foods. The ability to use a customary resource for subsistence depends on the availability of and access to that resource in traditional harvest locations. The resource must be available in sufficient numbers and of adequate health to allow a locally satisfactory harvest. A satisfactory harvest, in turn, would allow the subsistence community to participate in related activities. Access to resources can be affected by roads or trails that enhance access, by physical barriers (such as demonstrators who block access), by regulatory barriers, or by social barriers (such as an influx of recreational boaters into an area, displacing traditional users or resources). Traditional subsistence users of a resource may derive satisfaction from harvesting, processing, sharing, and consuming traditional foods. These activities reinforce traditional knowledge through use, exchange of knowledge, and training in traditional ways of performing subsistence activities (Section 3.10.3.5.2, Makah Subsistence Consumption).

Under any of the alternatives, the extent to which the Tribe can engage in subsistence use of whales would depend on the ability to hunt, the timing and area of the hunt, and the number of whales that could be harvested.

4.10.2.2 Traditional Knowledge and Activities

Surviving on locally available resources requires an intimate understanding of the environment based on a long-term relationship with the surrounding land, water, and resources. This knowledge comes from continued interaction with and observation of the surrounding environment and resources through subsistence activities as well as through oral tradition passed down from elders to other community members, and shared by active community residents. Individuals who carry and transfer this knowledge are generally those with a long history of participation in subsistence activities. The more a culturally important activity is practiced, the more likely it is that knowledge of that activity will pass from generation to generation. This valuable knowledge is not simply given away. Instead, community members who perform culturally important activities relay the knowledge, and younger participants earn the right to help as they learn from their elders. In some cases, only a limited number of people know specific skills (e.g., a harpooner) (Section 3.10.3.5.1, Makah Whaling).

If there is a hiatus in practicing the activity, the knowledge may be lost. It may take a long time, but eventually knowledge of specific elements of the activity wanes as elders die, especially if the cultural activities are not actively practiced. Maintaining traditional and cultural knowledge regarding whale hunting requires active participation in whale hunting (Section 3.10.3.4.1, Cessation of the Hunt).

Along with the knowledge of an activity, there are specific indigenous words (vocabulary) used to describe the activity, preparation for the activity, the hunting equipment, the weather and elements, the food, and ways to prepare the food, comprising a seemingly endless and detailed list. Participation in the traditional activity results in more use of indigenous words and language to describe the activity; this, in turn, results in increased cultural awareness and more people and communities identifying themselves with their indigenous culture (cultural identity through shared language). In time, knowledge, activity, and transmission from generation to generation become part of an oral tradition (Section 3.10.3.5.1, Makah Whaling).

Under any of the alternatives, the number of traditional activities tribal members can practice and the number of times they can practice them, as well as the amount of traditional knowledge tribal members can apply and transmit, would depend on the number of opportunities to hunt and harvest whales and the number of whales available for the Tribe to use. The number of opportunities to hunt, and the number of whales available, would depend on the timing and area of the hunt and on the number of whales that could be harvested.

4.10.2.3 Spiritual Connection to Whale hunting

Makah whale hunting rituals, spiritual and physical training, songs, dances, and ceremonial activities are well documented historically and in association with the 1999 and 2000 whale hunts (Section 3.10.3.4, Makah Historic Whaling, and Section 3.10.3.5.1, Makah Whaling). Whale hunts increase participation in ceremonial activities and rituals related to whale hunting. Similarly, the spiritual connection to whale hunting is strengthened as participants prepare for and conduct the whale hunt and then share the proceeds of the harvest. Makah whale hunting reinforces the relationship between the Makah and the whales. Makah tribal lore indicates that when the hunters and family prepare for the hunt and conduct it properly, perform the appropriate rituals, and live the culturally correct way, the whale gives itself to the Makah.

The amount of spiritual connection that tribal members have to whale hunting would depend primarily on the ability to hunt. The extent of that opportunity could also affect tribal members' spiritual connection to whale hunting. The extent of the opportunity to hunt would depend on the timing and area of the hunt and on the number of whales that could be harvested.

4.10.2.4 Cultural Identity

Under current conditions, the cultural identity of Makah tribal members is expressed in a variety of ways, including fishing, singing, dancing, potlatching, making traditional handicraft articles, and using the Makah language. Section 3.10.3.5, Contemporary Makah Society, describes the various activities available to tribal members to experience and strengthen their cultural identity. The Makah tribal and cultural identity associated with whale hunting in particular is well documented (Section 3.10.3.5.3, Symbolic Expression of Whaling). Actively hunting whales enhances the community's connection to its whale hunting history and reinforces the sense of connection to the local marine environment and to ancestors who used the resource in the past. Other measures of cultural identity associated with whale hunting include the following:

- Use of the whale as a cultural symbol
- Pride in whale hunting traditions
- Traditional values of pride, self esteem, responsibility, and identification with the past
- Local perceptions of community cultural identity with whale hunting
- Tribal identity
- A sense of the community cooperatively working together toward the common cultural goal of preparing to hunt, harvesting, processing, distributing, and eating the product of their communal labor
- A sense of autonomy

The amount of cultural identity associated with whale hunting would depend primarily on the ability to hunt. The extent of the opportunity to hunt could also affect the amount of cultural identity derived from whale hunting. The extent of the opportunity to hunt would in turn depend on the timing and area of the hunt and on the number of whales that could be harvested.

4.10.3 Evaluation of Alternatives

The following sections compare the potential for the alternatives to affect Makah ceremonial and subsistence practices. For each alternative, the analysis considers its effect on ceremonial and subsistence practices, including subsistence uses, traditional knowledge and activities, spiritual connection to whale hunting, and cultural identity that would result from a decision by the federal government to permit or deny the Makah Tribe's request to hunt whales. For those alternatives that would allow hunting, the analysis also considers the effect of hunting regulations on the same set of ceremonial and subsistence practices.

The No-action Alternative carries the greatest risk of adverse effects on the Makah Tribe's ceremonial and subsistence practices associated with whale hunting. This is because under the No-action Alternative, no whale hunting would be allowed so these practices either could not occur or would be restricted. In contrast, Alternatives 2 through 6 would all allow the Makah to hunt whales, with variations in season, area, and harvest limits. Having an opportunity to hunt whales would enable the Tribe to engage more frequently in a greater range of ceremonial and subsistence practices, compared to current conditions under the No-action Alternative. The amount of increase could be affected by regulations on hunting. Possible regulations include limits on the timing and area that a hunt would be allowed, and on the number of whales that could be struck and harvested, including limits on identified whales. Alternative 6, with the least amount of regulation on hunting, has the greatest potential to benefit the Tribe's ceremonial and subsistence practices associated with hunting whales.

In the following discussions of Alternatives 2 through 6, the degree of change from the current condition (No-action Alternative), and the comparison to other alternatives, is included in the summary of effects section.

4.10.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted. Gray whales would continue to be available in that they are abundant in traditional harvest areas, but the Makah would not have access to hunt them. Tribal members could engage in some activities associated with whale hunting, such as performing ceremonies and rituals; building whale-hunting canoes; or processing, sharing and consuming drift whales or whales incidentally caught in fisheries. Only four whales have been reported entangled in nets in the past 15 to 20 years, and the Tribe used only one such whale in 1995 (Section 2.4.2, Subsistence Use of Drift Whales). Moreover, many of these permitted activities have limited cultural value if they are not practiced in connection with actual whale hunts. Many other activities associated with the actual hunt would not be permitted and could not occur, such as approaching, striking, killing and towing whales to shore.

Under the No-action Alternative, transfer of knowledge related to whale hunting would be limited to discussions of past whale hunting, and revitalized culture bearers who would participate in whale hunting would not be forthcoming. There would be no language and vocabulary growth related to whale-hunting activities, and the oral tradition of whale hunting would focus on historic activities and would not include ongoing participation in this culturally central activity.

Under current conditions, the opportunity for tribal members to experience a spiritual connection to whale hunting is limited to a connection with past whale hunting. Whale hunting songs and dances would likely remain within whale hunting families, but the 70-year hiatus would resume and there would be little reason or opportunity to perform and share them with the larger community. Without any whale hunting activity, the spiritual connection to whale hunting may eventually wane, and young Makah tribal members would lack any active whaler role models living what the Makah consider a culturally proper life that they could respect, admire, and emulate. The community connection to whale hunting would remain a connection to the past without any present reinforcement based on active participation in whale hunting activities.

Although the amount of whale hunting activity and associated cultural use of whales would not differ from current levels, tribal identity could erode in the absence of opportunities to participate in an activity central to Makah cultural identity. The community would have little or no opportunity or incentive to work cooperatively to prepare for the hunt; to harvest, butcher, share, and eat whale; or to participate in song and dance festivals celebrating a successful harvest. Individual and community pride associated with conducting these activities would not occur, and self-esteem could decline among those Makah tribal members (88.8 percent) (Renker 2007) who believe the Tribe should continue to hunt whales.

In addition, because contemporary Makah cultural identity includes the 150-year-old treaty right to hunt whales, this alternative would continue to reinforce the sense that the Makah are not in control of their destiny, and it would undermine a sense of autonomy within the community. For Makah who believe strongly in their cultural heritage and treaty rights, this alternative would reinforce their feeling of disillusionment with the federal government.

4.10.3.2 Alternative 2

Under Alternative 2, the Tribe may strike up to seven whales per year, harvest four whales on average per year (with a maximum of five in any one year) and strike and lose three whales per year. Hunting is limited to the period from December 1 through May 1, in the coastal portion of the Makah U&A. Limits would be imposed on the harvest of identified whales. Section 4.1, Introduction, describes the number of days of hunting likely to occur under Alternative 2, and the reasons for expecting that it may be difficult for the Tribe to harvest the full limit of whales allowed under this Alternative. The first part of this analysis describes some of the practical effects of the hunting conditions imposed by Alternative 2, and the Makah's perceptions and expectations regarding these conditions. The second part of the analysis considers the potential effect of implementing Alternative 2 on the Makah's subsistence use of whales; practice of traditional activities and application and transmission of traditional knowledge; spiritual connection to whaling; and cultural identity.

4.10.3.2.1 Limits on Whale Hunting

Hunt Timing

Under Alternative 2, the Makah Tribe has proposed to limit hunting to the period from December 1 through May 31. The period December 1 through May 31 is characterized by inclement weather that would likely limit the number of times the Makah could engage in a hunt to approximately 7 to 30 days per year. Whale hunting traditionally occurred year-round, whenever whales were present, and there was a need for them Braund et al. (2007). Historically, the hunting season for gray whales began in March, when they appeared in numbers off Tatoosh Island on their coastal migration north, and resumed in November during their migration south. Pods of humpback and grays may have remained in the area all summer (Huelsbeck 1994), permitting whale hunting to occur from early spring through the fall (Section 3.10.3.4, Makah Historic Whaling). Some tribal members view summer and fall as the best times to hunt whales because they are migrating south and weather conditions are ideal (Braund et al. 2007).

By allowing hunting only during the winter and spring months, when severe weather would be a frequent occurrence, Alternative 2 would likely limit the number of hunting days to 7 to 30 days. This in turn could make it difficult to harvest the four whales annually allowed under Alternative 2. In addition, tribal members would not have the latitude to harvest whales at opportune times, such as when whales are available or when hunters are prepared.

Hunting Area

Restricting whale hunts to the portions of the U&A west of the Bonilla-Tatoosh line would keep the Makah from hunting whales in the Strait of Juan de Fuca. Historically, Makah whaled both in the ocean and in the Strait, depending on weather, wind, and the presence of whales. Disallowing whale hunts in the Strait would eliminate a large area from hunter access. It would also reduce opportunities to kill a whale close to the community. A greater distance between the site of a whale kill and the location of the landing beach would mean a greater distance over which the whale carcass would have to be towed, with a greater chance of the meat spoiling. Enforcing this restriction would also eliminate a traditional whale-hunting territory.

Some Makah tribal members believe that excluding the Strait of Juan de Fuca from their hunting area would place whalers at increased risk, would prohibit them from whale hunting where their ancestors had traditionally whaled, and would affect their ability to successfully take a whale (Braund et al. 2007). The Makah traditionally hunted in the Strait, where boating conditions are safer because the weather is calm, compared to the ocean, which can have 25-foot waves (Braund et al. 2007). The restriction on location would contrast with traditional hunting, which occurred when and where the whales presented themselves, including in the Strait (Braund et al. 2007).

By allowing hunting only in the coastal portion of the Makah U&A, combined with restrictions on hunt timing, Alternative 2 would likely limit the number of hunting days to 7 to 30 days. This in turn could make it difficult to harvest the four whales annually allowed under Alternative 2. In addition, tribal members would not have the latitude to harvest whales at opportune locations, such as when whales are available in the Strait or weather conditions are more favorable.

Strike and Harvest Limits

Because the Makah have harvested only one whale in the last seven-plus years (the 1999 harvest), there are few current whale harvest data upon which to assess the effect of the size of the harvest in terms of meeting Makah needs. However, as described in Section 3.10.3.5.2, Makah Subsistence Consumption, the Makah do rely on subsistence foods for a significant portion of their diet and emphasize marine resources. Furthermore, the 2001 tribal survey found that 81 percent of the respondents consumed whale products (blubber, meat, or oil) obtained from the 1999 hunt, and 87 percent would like to have these products available in the future (Renker 2002 in Section 3.10, Ceremonial and Subsistence Resources). According to Renker’s 2006 household survey (Renker 2007), 71.7 percent of survey respondents wanted whale meat in the households on a regular basis, and 67.1 percent wanted whale oil.

Sepez (2001) calculated that the Makah households received an estimated 2.4 pounds of whale meat (.55 pounds) and blubber (1.8 pounds) per capita from the 1999 whale hunt. Makah members have commented that the one whale was not adequate to feed the entire community (Braund et al. 2007). It was not large enough to go around as a meaningful source of food.

According to Sepez's (2001) analysis (Section 3.10.3.5.1, Makah Whaling), the 1999 whale harvested by the Makah yielded approximately "2,000 to 3,000 pounds of meat and 4,000 to 5,000 pounds of blubber, most of which was consumed at the community potlatch."

This information indicates that there is a high demand for whale products, and one whale would not likely meet that need. It is uncertain whether four whales annually would meet contemporary Makah needs. The primary indication they would is the fact that the Makah have requested an average of four whales annually (i.e., approximately one whale per year per Makah village) (Renker 2007). If the Tribe had the opportunity to strike seven whales, harvest four, and strike and lose three annually, that would provide substantial opportunity to the Makah to prepare for, hunt, process, share, and participate in ceremonial activities associated with whale hunting. Under Alternative 2, limits on timing and area of the hunt along with limits on the number of identified whales that may be harvested from the PCFA survey area, would make it difficult for the Makah to harvest the full quota. Thus the number of whales the Makah could actually hunt and harvest under Alternative 2 may in practice be somewhat fewer than the average annual limit of four allowed under Alternative 2.

4.10.3.2.2 Opportunity to Resume Whale Hunting

Subsistence use

Under Alternative 2, the opportunity to resume hunting and harvesting whales would increase the Makah Tribe's ability to engage in a broad range of subsistence practices that are currently not possible or are severely limited. Under Alternative 2 the Makah could hunt for gray whales, a traditional marine resource, from December 1 through May 31 in the coastal portion of their U&A, using many of their traditional methods. It is reasonable to expect that the hunt timing would allow 7 to 30 days of hunting per year. The Tribe could harvest as many as four whales per year, and the Makah community could process, share, and consume this traditional food.

Under Alternative 2, the amount of the Tribe's subsistence use would thus increase from no opportunity to hunt under current conditions to an opportunity to hunt in the coastal portion of the Tribe's U&A for 7 to 30 days, from December 1 through May 31. The amount of subsistence use of whales would also increase by four harvested whales per year compared to the current potential use of perhaps one whale every five years under the No-action Alternative. Under Alternative 2, with its limited hunting season, it may be difficult for the Tribe to harvest the full limit of four whales on average per year. On the other hand, the hunting season under Alternative 2 occurs during the whales' southward migration when, according to some tribal members, the whales are fatter and would thus provide more products for ceremonial and subsistence use than whales harvested during the fall northward migration or early in the summer feeding period (which begins June 1).

The amount of satisfaction the Tribe would derive from this increased subsistence use of whales would also likely increase compared to current conditions. The Tribe's needs statement indicated that 67.1 percent of surveyed households would like whale oil on a regular basis, 71.7 percent would like whale meat on a regular basis, and 47.4 percent would like whale blubber on a regular basis (Renker 2007).

Traditional Knowledge and Activities

As described above, under current conditions tribal members may engage in some, but not all, of the traditional activities associated with subsistence use of whales. The ability to actively hunt whales, which is prohibited under current conditions, would be allowed under Alternative 2, increasing the number of traditional activities that tribal members could practice. Specifically, tribal members could search for and find whales and strike, harvest, and tow whales to shore. The number of times tribal members could participate in searching for and finding whales would increase compared to the No-action Alternative by approximately 7 to 30 days per year, from December 1 through May 31. The number of times they could participate in striking, harvesting, and towing whales to shore would increase by up to seven whales struck per year and four whales harvested per year on average. The increase in the number of times these activities are performed would also increase the amount of traditional knowledge associated with the activities, and the opportunities to apply and transmit that knowledge.

In addition to permitting some currently-prohibited activities, thus increasing the number of traditional activities that could be practiced, implementation of Alternative 2 could increase the number of times tribal members engage in activities that are not currently prohibited. Specifically, tribal members are not currently prevented from building large whale-hunting canoes or fabricating and maintaining whale-hunting equipment, but there is little practical reason for them to do so. If a whale hunt were authorized under Alternative 2, there would likely be an increase in the number of times that tribal members practice these activities.

Similarly, tribal members are not currently prohibited from processing and consuming whale products from drift whales, but the opportunity to do so is limited. The number of times tribal members could participate in processing whales would increase from the current potential of perhaps one whale every five years to four whales per year. The amount of whale products tribal members could share and consume would similarly increase from one whale every five years to four whales per year, although limits on hunt timing and harvest of identified whales might make it difficult for tribal members to harvest the full limit.

Under Alternative 2 tribal members would again actively practice the skills necessary to build large whale-hunting canoes; fabricate and maintain whale hunting-equipment; search for and find whales; strike, harvest, and tow whales to shore; butcher and distribute them; and perform ceremonial songs and dances to celebrate successful hunts. As a result, words and vocabulary related to preparing to hunt, hunting, harvesting, towing, and processing whales, as well as sharing, preparing, and consuming whale products, could become more widely used than they currently are (Braund et al. 2007). Makah cultural awareness, both inside and outside of the Tribe, would become more pronounced, and the whale-hunting component of the Makah oral tradition would grow.

In contrast to the No-action Alternative, Alternative 2 would enable new generations to participate in whale hunting activities; develop, apply and transmit knowledge of whale hunting; and learn and use words related to whale hunting. Makah youth would have active whalers as role models. With a resumption of whale hunting,

Spiritual Connection to Whale Hunting

Under Alternative 2, the ability to resume whale hunting could increase the Makah's spiritual connection to whale hunting over the current connection, as whale-hunting activity could resume and recur year after year. This is because the connection would be current and ongoing, rather than a connection to a past activity that can no longer be pursued (Braund et al. 2007).

Cultural Identity

As described above and in Section 3.10.3.5, Contemporary Makah Society, Makah tribal members currently have a variety of ways to express and reinforce their cultural identity. Also as described above and in Sections 3.10.3.4, Makah Historic Whaling, and 3.10.3.5.3, Symbolic Expression of Whaling, whale hunting was a culturally central activity in historic Makah society and the Tribe's whale-hunting past remains culturally important. Under Alternative 2, Makah whale-hunting rituals, spiritual training, songs, dances, and ceremonial activities would likely increase over current conditions, and regularly recur, reinforcing Makah cultural identity. The opportunity under Alternative 2 to regularly harvest, process, share, and consume whale products could lead to increased communal activities and an increase in tribal members' sense of community. The whale hunting ceremonies that whalers and family members would follow for the hunt could provide the Makah with an additional social framework, which could contribute to community social and spiritual stability.

4.10.3.3 Alternative 3

Under Alternative 3, the Tribe could strike up to seven whales per year, harvest four whales on average per year (with a maximum of five in any one year) and strike and lose three whales per year. Hunting would be allowed year round in the coastal portion of the Makah U&A and no limits would be imposed on the harvest of identified whales. Section 4.1, Introduction, describes the number of days of hunting likely to occur under Alternative 2, and the reasons for expecting the Tribe would be able to harvest the full limit of whales allowed under this Alternative. The first part of this analysis describes some of the practical effects of the hunting conditions imposed by Alternative 3, and the Makah's perceptions and expectations regarding these conditions. The second part of the analysis considers the potential effect of implementing Alternative 3 on the Makah's subsistence use of whales; practice of traditional activities and application and transmission of traditional knowledge; spiritual connection to whaling; and cultural identity.

4.10.3.3.1 <u>Limits on Whale Hunting</u>

Hunt Timing

Hunting year round under Alternative 3 would enable Makah tribal members to hunt at the most opportune time, based on sea and weather conditions, presence and availability of whales, subsistence need, and preparedness of hunters. This year-round season would also allow hunters to harvest whales on both their northward spring migration, as well as the migration south. Whales would probably be harvested during late spring, summer, and early autumn, when weather conditions would be less likely to interfere with hunting opportunities and to compromise hunter safety. Because of the year-round opportunity to hunt, including during seasons of relatively calm weather, the Makah could hunt as many days as necessary to allow harvest of the quota of four whales per year. As described in Section 4.1, Introduction, based on the 10 days of hunting required to harvest one whale in 1999, this analysis uses 40 days as a reasonable estimate of the number of days of hunting that would occur under Alternative 3.

If there were no restrictions Makah members generally indicated that they would hunt during the spring and fall whale migrations, as well as during the summer (Braund et al. 2007). Several Makah indicated that the whales are fatter in the fall on their migration south. One individual reported this, as well as stating a preference for hunting during the spring, observing that summer tourism and fall weather conditions could interfere with whale hunting during those times. By allowing hunting year round, Alternative 3 provides the ability to harvest whales at the most opportune times for the whalers.

Hunting Area

Under Alternative 3, the hunting area would be limited to the coastal portion of the Makah U&A and exclude the Strait of Juan de Fuca. This would limit the flexibility of tribal members to hunt in the Strait when weather conditions there are more favorable. Because of the opportunity to hunt year round, however, the limitation on hunting area would likely not limit the number of days the Tribe could hunt or the number of whales the Tribe could harvest. By limiting hunting to the coastal portion of the Makah U&A, Alternative 3 precludes the ability of tribal members to hunt in their entire U&A and to harvest whales in areas that may be close to butchering sites. It also limits the flexibility of tribal members to hunt in the most opportune locations.

Strike and Harvest Limits

Strike and harvest limits would be the same under Alternative 3 as under Alternative 2. As described under Alternative 2, above, there is a high demand for whale products, and it is uncertain whether four whales annually would meet contemporary Makah needs. The primary indication they would is the fact that the Makah have requested four whales annually (Renker 2007). If the Tribe had the opportunity to strike seven whales, harvest four, and strike and lose three annually, that would provide substantial opportunity to the Makah to prepare for, hunt, process, share, and participate in ceremonial activities associated with whale hunting. The ability to hunt year round under Alternative 3, along with the lack of limits on harvesting identified whales, would make it likely that the Makah could harvest the full quota.

4.10.3.3.2 Opportunity to Resume Whale Hunting

Subsistence Use

Under Alternative 3, the opportunity to resume hunting and harvesting whales would increase the Makah Tribe’s ability to engage in a broad range of subsistence practices that are currently not possible or are severely limited. Under Alternative 3 the Makah could hunt for gray whales, a traditional marine resource, year round in the coastal portion of their U&A, using many of their traditional methods. The hunt timing would likely allow hunting on as many days as required to harvest the number of whales allowed, which would most likely be 40 days of hunting per year. The Tribe could harvest as many as four whales per year, and the Makah community could process, share, and consume this traditional food.

Under Alternative 3, the amount of the Tribe's subsistence use would thus increase from no opportunity to hunt under current conditions to an opportunity to hunt in the coastal portion of the Tribe's U&A for 40 days year round. The amount of subsistence use of whales would also increase by four harvested whales per year compared to the current potential use of perhaps one whale every five years under the No-action Alternative. Because hunting would be allowed year round, it is likely the Tribe could harvest the full number of whales allowed. Moreover, the lack of limits on the hunting season would allow the subsistence use of fresh whale products year round.

Compared to Alternative 2, the Tribe's subsistence use of whales would be greater because year-round hunting would allow for more days of hunting during better weather conditions, making it more likely the Tribe could harvest the full number of whales allowed. Lack of limits on identified whales would also make it more likely tribal members could harvest the full number.

Traditional Knowledge and Activities

As described above, under current conditions tribal members may engage in some, but not all, of the traditional activities associated with subsistence use of whales. The ability to actively hunt whales, which is prohibited under current conditions, would be allowed under Alternative 3, increasing the number of traditional activities that tribal members could practice. Specifically, tribal members could search for and find whales and strike, harvest, and tow whales to shore. The number of times tribal members could participate in searching for and finding whales would increase compared to the No-action Alternative by approximately 40 days per year, year round. The number of times they could participate in striking, harvesting, and towing whales to shore would increase by up to seven whales struck per year and four whales harvested per year on average. The increase in the number of times these activities are performed would also increase the amount of traditional knowledge associated with the activities, and the opportunities to apply and transmit that knowledge.

In addition to permitting some currently-prohibited activities, thus increasing the number of traditional activities that could be practiced, implementation of Alternative 3 would likely increase the number of times tribal members engage in activities that are not currently prohibited. Specifically, tribal members are not currently prevented from building large whale-hunting canoes or fabricating and maintaining whale-hunting equipment, but there is little practical reason for them to do so. If a whale hunt were authorized under Alternative 3, there would likely be an increase in the number of times that tribal members practice these activities.

Similarly, tribal members are not currently prohibited from processing and consuming whale products from drift whales, but the opportunity to do so is limited. The number of times tribal members could participate in processing whales would increase from the current potential of perhaps one whale every five years to four whales per year. The amount of whale products tribal members could share and consume would similarly increase from one whale every five years to four whales per year.

Under Alternative 3 tribal members would again actively practice the skills necessary to build large whale hunting-canoes; fabricate and maintain whale-hunting equipment; search for and find whales; strike, harvest, and tow whales to shore; butcher and distribute them; and perform ceremonial songs and dances to celebrate successful hunts. As a result, words and vocabulary related to preparing to hunt, hunting, harvesting, towing, and processing whales, as well as sharing, preparing, and consuming whale products, would likely become more widely used than they currently are.

In contrast to the No-action Alternative, Alternative 3 would enable new generations to participate in whale hunting activities; develop, apply and transmit knowledge of whale hunting; and learn and use words related to whale hunting. Makah youth would have active whalers as role models. With a resumption of whale hunting, Under Alternative 3 the amount of satisfaction the Tribe might derive from the practice of traditional activities and the application of traditional knowledge, would increase beyond the current level.

Compared to Alternative 2, Alternative 3 is likely to result in a greater number of occasions on which tribal members can engage in traditional activities and apply traditional knowledge (40 days of hunting versus 7 to 30). It is also more likely the Tribe could harvest (and thus process) the full number of whales allowed. Thus Alternative 3 is likely to result in more occasions on which tribal members can practice traditional activities and apply traditional knowledge than Alternative 2.

Spiritual Connection to Whaling

Under Alternative 3, the ability to resume whale hunting would likely increase the Makah's spiritual connection to whale hunting over current conditions, as described under Alternative 2.

Cultural Identity

Under Alternative 3, the ability to resume whale hunting would likely increase the cultural identity of the Makah over current conditions, as described under Alternative 2.

4.10.3.4 Alternative 4

Alternative 4 contains most of the same regulations on whale hunting as Alternative 2. Under Alternative 4, the Tribe may strike up to seven whales per year, harvest four whales on average per year (with a maximum of five in any one year) and strike and lose three whales per year. Hunting would be limited to December 1 through May 31 in the coastal portion of the Makah U&A and limits would be imposed on the harvest of identified whales. Alternative 4 contains the additional restrictions that no hunting may occur within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges. This added restriction may affect the Tribe's perceived or actual ability to harvest the full number of whales allowed. Section 4.1, Introduction, describes the number of days of hunting likely to occur under Alternative 4, and the reasons for expecting that it may be difficult for the Tribe to harvest the full limit of whales allowed under this Alternative. The first part of this analysis describes some of the practical effects of the hunting conditions imposed by Alternative 4, and the Makah's perceptions and expectations regarding these conditions. The second part of the analysis considers the potential effect of implementing Alternative 4 on the Makah's subsistence use of whales; practice of traditional activities and application and transmission of traditional knowledge; spiritual connection to whaling; and cultural identity.

4.10.3.4.1 <u>Limits on Whale Hunting</u>

Hunt Timing

Hunt timing would be the same under Alternative 4 as under Alternative 2, with the same practical effects and tribal perceptions and expectations.

Hunting Area

Hunting only in the ocean (excluding the Strait of Juan de Fuca) would have the same effects as Alternative 2. The additional restriction under Alternative 4 of not hunting within 200 yards of rocks and islands would further restrict Makah hunters' opportunity to hunt. These areas are traditional hunting grounds (Braund et al. 2007). Additionally areas near rocks and islands are shallower and, thus, are better locations for striking whales (Braund et al. 2007).

By prohibiting hunting in a portion of the Makah U&A (the Strait of Juan de Fuca) that is often protected from severe weather, Alternative 4 could reduce the number of hunts that take place and possibly the number of whales that might be harvested, compared to alternatives that lack such restrictions. The additional restriction on hunting near certain rocks and islands would further hinder whale hunting. These restrictions would interfere with the Makah's exercise of ceremonial and subsistence practices, but to a lesser degree than the No-action Alternative, under which no whale hunting would be allowed.

Strike and Harvest Limits

The strike and harvest limits under Alternative 4, and the limit on the harvest of identified whales, would be the same as under Alternative 2, with the same practical effects and tribal perceptions and expectations.

4.10.3.4.2 <u>Opportunity to Resume Whale Hunting</u>

Subsistence use

Under Alternative 4, the opportunity to resume hunting and harvesting whales would increase the Makah Tribe's ability to engage in a broad range of subsistence practices that are currently not possible or are severely limited. Under Alternative 4 the Makah could hunt for gray whales, a traditional marine resource, from December 1 through May 31 in the coastal portion of their U&A, and outside 200 yards of rocks and islands, using many of their traditional methods. The hunt timing would most likely allow 7 to 30 days of hunting per year. The Tribe could harvest as many as four whales per year, and the Makah community could process, share, and consume this traditional food.

Under Alternative 4, the amount of the Tribe's subsistence use would thus increase from no opportunity to hunt under current conditions to an opportunity to hunt in the coastal portion of the Tribe's U&A for 7 to 30 days, from December 1 through May 31. The amount of subsistence use of whales would also increase by four harvested whales per year compared to the current potential use of perhaps one whale every five years under the No-action Alternative. Under Alternative 4, with its limited hunting season and prohibition on hunting within 200 yards of rocks and islands, it may be difficult for the Tribe to harvest the full limit of four whales on average per year. On the other hand, the hunting season under Alternative 4 occurs during the whales' southward migration when, according to some tribal members, the whales are fatter and would thus provide more products for ceremonial and subsistence use than whales harvested during the fall northward migration or early in the summer feeding period (which begins June 1).

The amount of satisfaction the Tribe would derive from this increased subsistence use of whales would also likely increase over current conditions, in the ways described under Alternative 2, although possibly to a lesser extent because of the prohibition against hunting around rocks and islands.

Compared to Alternative 2, Alternative 4 could result in a somewhat lower chance that the Tribe would be able to harvest the full amount of whales allowed per year. If that happened, then Alternative 4 would represent less of an increase in subsistence use of whales over current conditions.

Compared to Alternative 3, which does not include limits on hunt timing or prohibitions against hunting around rocks and islands, Alternative 4 is likely to result in a lower chance that the Tribe would be able to harvest the full amount of whales allowed per year. In addition, the restrictions on hunt timing under Alternative 2 would result in fewer hunting days than under Alternative 3. Alternative 4 is thus likely to result in a smaller increase in the subsistence use of whales, compared to current conditions, than would Alternative 3.

Traditional Knowledge and Activities

Under Alternative 4, the increase in traditional knowledge and activities over current conditions would likely be the same as under Alternative 2 because the hunting conditions are substantially the same under the two alternatives, with the exception of the prohibition on hunting within 200 yards of rocks and islands under Alternative 4. This prohibition would not likely change the number of days of hunting as under Alternative 2 (7 to 30). Therefore, compared to the current condition, the increase in traditional knowledge and activities associated with active hunting for whales would be about the same under Alternative 4 as under Alternative 2, with the possible exception of processing, sharing and consuming whale products.

Under Alternative 4, the number of times tribal members could participate in processing whales would increase from the current potential of perhaps one whale every five years to four whales per year. The amount of whale products tribal members could share and consume would similarly increase from one whale every five years to four whales per year, although limits on hunt timing and harvest of identified whales, and on hunting near rocks and islands, might make it difficult for tribal members to harvest the full limit. Under Alternative 4, other aspects of traditional knowledge and activities would likely increase over current conditions to the same extent as under Alternative 2.

Compared to Alternative 3, which does not include limits on hunt timing, or prohibitions against hunting around rocks and islands, Alternative 4 is likely to result in fewer days of hunting and a lower chance that the Tribe would be able to harvest the full amount of whales allowed per year. Alternative 4 is thus likely to result in a smaller increase in the subsistence use of whales, compared to current conditions, than would Alternative 3.

Spiritual Connection to Whaling

Under Alternative 4, the ability to resume whale hunting would likely increase the Makah's spiritual connection to whale hunting over current conditions, as described under Alternative 2.

Cultural Identity

Under Alternative 4, the ability to resume whale hunting would likely increase the cultural identity of the Makah over current conditions, as described under Alternative 2.

4.10.3.5 Alternative 5

Under Alternative 5, the Tribe may strike up to three whales per year, harvest two whales per year and strike and lose three whales per year. Hunting may occur year round in the coastal portion of the Makah U&A and no limits would be imposed on the harvest of identified whales. Section 4.1, Introduction, describes the number of days of hunting likely to occur under Alternative 5, and the reasons for expecting that it is likely the Tribe could harvest the full limit of two whales per year. The first part of this analysis describes some of the practical effects of the hunting conditions imposed by Alternative 2, and the Makah's perceptions and expectations regarding these conditions. The second part of the analysis considers the potential effect of implementing Alternative 5 on the Makah's subsistence use of whales; practice of traditional activities and application and transmission of traditional knowledge; spiritual connection to whaling; and cultural identity.

4.10.3.5.1 Limits on Whale Hunting

Hunt Timing

Alternative 5 would allow year-round hunting, similar to Alternative 3. The practical effect of a year-round hunting season, and tribal perceptions and expectations regarding the hunting season, would therefore be the same under Alternative 5 as under Alternative 3.

Hunting Area

The hunting area under Alternative 5 would be the coastal portion of the Makah U&A, similar to Alternatives 2 and 3. The practical effect of a year-round hunting season, and tribal perceptions and expectations regarding the hunting season, would therefore be the same under Alternative 5 as under Alternative 3.

Strike and Harvest Limits

Two whales annually would represent 50 percent of the Makah request of four whales. The 1999 whale provided approximately 2.4 pounds of meat and blubber per capita, "most of which was consumed at the community potlatch" (Section 3.10, Ceremonial and Subsistence Resources).

The Makah household whale hunting surveys conducted in 2001 and 2006 documented that most Makah residents expressed a continued desire for whale products. According to 2001 household survey results, "87 percent surveyed desired whale meat as part of their regular diet, and 72 percent voiced a desire for whale oil" (Section 3.10, Ceremonial and Subsistence Resources). Five years later, during the 2006 survey, 80.3 percent of respondents reported that they continued to desire whale products (Section 3.10, Ceremonial and Subsistence Resources). In addition, Sepez (2001) reported that 73 percent of the surveyed households planned to eat whale obtained from future hunts (Section 3.10, Ceremonial and Subsistence Resources). Renker (2007) reported that Makah tribal members numbered 2,389 persons, with 1,228 of those living on the reservation. Whale products would be shared with Makah living in and outside of Neah Bay. With the high percentage of Makah residents desiring whale products for consumption and use, limiting the number of whales harvested to two would likely not satisfy the Makah's need for whale products; would result in fewer opportunities to hunt, process, share and consume whales; and would not adequately facilitate participation in whale-hunting activities by Makah residents (Braund et al. 2007).

4.10.3.5.2 <u>Opportunity to Resume Whale Hunting</u>

Subsistence Use

Under Alternative 5, the opportunity to resume hunting and harvesting whales would increase the Makah Tribe's ability to engage in a broad range of subsistence practices that are currently not possible or are severely limited. Under Alternative 5 the Makah could hunt for gray whales, a traditional marine resource, year round in the coastal portion of their U&A, using many of their traditional methods. The hunt timing would most likely allow 20 days of hunting per year. The Tribe could harvest as many as two whales per year, and the Makah community could process, share, and consume this traditional food.

Under Alternative 5, the amount of the Tribe's subsistence use would thus increase from no opportunity to hunt under current conditions to an opportunity to hunt in the coastal portion of the Tribe's U&A for 20 days year round. The amount of subsistence use of whales would also increase by up to two harvested whales per year compared to the current potential use of perhaps one whale every five years under the No-action Alternative.

The amount of satisfaction the Tribe would derive from this increased subsistence use of whales would also likely increase over current conditions, but as indicated above is not perceived by tribal members as adequate to meet the Tribe's needs. The Tribe's needs statement indicated that

67.1 percent of surveyed households would like whale oil on a regular basis, 71.7 percent would like whale meat on a regular basis, and 47.4 percent would like whale blubber on a regular basis (Renker 2007:22).

Compared to Alternatives 2, 3, and 4, which would allow the subsistence use of four whales per year, Alternative 5 would result in less subsistence use (two whales).

Traditional Knowledge and Activities

As described above, under current conditions tribal members may engage in some, but not all, of the traditional activities associated with subsistence use of whales. The ability to actively hunt whales, which is prohibited under current conditions, would be allowed under Alternative 5, increasing the number of traditional activities that tribal members could practice. Specifically, tribal members could search for and find whales and strike, harvest, and tow whales to shore. The number of times tribal members could participate in searching for and finding whales would increase compared to the No-action Alternative by approximately 20 days per year, year round. The number of times they could participate in striking, harvesting, and towing whales to shore would increase by up to three whales struck per year and two whales harvested per year on average. The increase in the number of times these activities are performed would also increase the amount of traditional knowledge associated with the activities, and the opportunities to apply and transmit that knowledge.

In addition to permitting some currently-prohibited activities, thus increasing the number of traditional activities that could be practiced, implementation of Alternative 5 would likely increase the number of times tribal members engage in activities that are not currently prohibited. Specifically, tribal members are not currently prevented from building large whale-hunting canoes or fabricating and maintaining whale-hunting equipment, but there is little practical reason for them to do so. If a whale hunt were authorized under Alternative 5, there would likely be an increase in the number of times that tribal members practice these activities.

Similarly, tribal members are not currently prohibited from processing and consuming whale products from drift whales, but the opportunity to do so is limited. The number of times tribal members could participate in processing whales would increase from the current potential of perhaps one whale every five years to two whales per year. The amount of whale products tribal members could share and consume would similarly increase from one whale every five years to up to two whales per year, although limits on hunt timing and harvest of identified whales might make it difficult for tribal members to harvest the full limit.

Under Alternative 5 tribal members would again actively practice the skills necessary to build large whale hunting canoes; fabricate and maintain whale hunting equipment; search for and find whales; strike, harvest, and tow whales to shore; butcher and distribute them; and perform ceremonial songs and dances to celebrate successful hunts. As a result, words and vocabulary related to preparing to hunt, hunting, harvesting, towing, and processing whales, as well as sharing, preparing, and consuming whale products, would likely become more widely used than they currently are.

In contrast to the No-action Alternative, Alternative 5 would enable new generations to participate in whale hunting activities; develop, apply and transmit knowledge of whale hunting; and learn and use words related to whale hunting. Makah youth would have active whalers as role models. With a resumption of whale hunting, Under Alternative 5 the amount of satisfaction the Tribe might derive from the practice of traditional activities and the application of traditional knowledge, would increase beyond the current level.

Compared to Alternatives 2, 3, and 4, the Makah Tribe would be able to practice the same number of activities and apply and transmit the same types of traditional knowledge. However, the number of times they could practice both currently allowed and currently prohibited activities, and could apply traditional knowledge, would be less under Alternative 5 than under Alternatives 2, 3, and 4.

Spiritual Connection to Whale Hunting

Under Alternative 4, the ability to resume whale hunting would likely increase the Makah's spiritual connection to whale hunting over current conditions, as described under Alternative 2.

Cultural Identity

Under Alternative 4, the ability to resume whale hunting would likely increase the cultural identity of the Makah over current conditions, as described under Alternative 2.

4.10.3.6 Alternative 6

Under Alternative 6, whale hunting would be allowed throughout the year (similar to Alternatives 3 and 5) and within the entire U&A, including the Strait of Juan de Fuca.

4.10.3.6.1 Limits on Whale Hunting

Hunt Timing

Alternative 6 would allow year-round hunting, similar to Alternatives 3 and 5. The practical effect of a year-round hunting season, and tribal perceptions and expectations regarding the hunting season, would therefore be the same under Alternative 6 as under Alternatives 3 and 5.

Hunting Area

Under Alternative 6, the Makah could hunt in their entire U&A, including the Strait of Juan de Fuca. Tribal members could hunt in all areas traditionally used by Makah whalers and some tribal members might consider this Alternative as more consistent with the Treaty of Neah Bay (although the limitation on hunting area was proposed by the Makah Tribe). Under Alternative 6 tribal members would be able to choose hunting times and locations based on whale availability and sea conditions (Braund et al. 2007).

By allowing hunting in the Strait of Juan de Fuca portion of the Makah U&A, Alternative 6 provides the ability to harvest whales in areas that may be close to butchering sites and gives tribal members the flexibility to hunt in the most opportune locations.

Strike and Harvest Limits

The strike and harvest limits under Alternative 6 would be the same as under Alternative 3, with the same practical effects and tribal perceptions and expectations.

4.10.3.6.2 <u>Opportunity to Resume Whale Hunting</u>

Under Alternative 6, the conditions on hunting would be sufficiently similar to those under Alternative 3 that they would lead to the same number of days of hunting, and the same likelihood that the Tribe would be able to harvest the full number of whales allowed. Thus the increase in the Tribe’s amount of subsistence use of whales over current conditions would be the same as that described under Alternative 3, as would the increase in the Tribe’s practice of traditional activities and application and transmission of traditional knowledge. Similarly, the increase in the Tribe’s spiritual connection to whaling, compared to current conditions, would be the same under Alternative 6 as under Alternative 3.

The Tribe might experience a greater sense of cultural identity under Alternative 6 than under Alternative 3 because of the ability to hunt in the entire U&A. Residents could experience an enhanced sense of autonomy when given the power to make their own decisions regarding the timing and locations of their hunts. A sense of autonomy is one of the measures of cultural identity (Section 4.10.2.4, Cultural Identity).

4.11 Noise

4.11.1 Introduction

This section addresses the potential for the alternatives to affect sensitive noise receptors in the project area, specifically receptors in the human environment. Of particular concern is the potential for noise from hunt-related activities (including vessels, aircraft, or firearms) to disturb residents, businesses, and visitors in the project area. Residential and commercial areas that could potentially be affected by noise from hunt-related activities include properties adjacent to Neah Bay and the Makah tribal Center, as well as low-density residential areas south of the Wa'atch River on the Pacific coast and near State Route 112 on the Strait of Juan de Fuca. Recreational users of the OCNMS, the Makah Reservation, and the Olympic National Park could also be affected by noise disturbance. The potential for hunt-related noise, including underwater noise, to disturb wildlife species is addressed in Section 4.5, Other Wildlife.

4.11.2 Evaluation Criteria

Two criteria were used to determine the potential for adverse effects on sensitive noise receptors under the alternatives. The first is the anticipated intensity and duration of noise produced by hunt-related activities (including vessels, vehicles, and aircraft involved in the hunt, protests, media, and law enforcement, as well as weapons used to strike and/or kill a whale). The second is anticipated noise levels at sensitive sites, as indicated by the distance between noise sources and potential receptors.

4.11.2.1 Noise Generated by Hunt-related Activities

Under current conditions, noise from vehicles, marine vessels, and aircraft is commonly heard throughout the project area. Other sources of noise include commercial areas, sports fields, logging operations, and the foghorn at Tatoosh Island. Natural sounds, such as those of wind and surf, contribute to high ambient noise levels in portions of the project area, particularly in areas close to the shoreline of the Pacific coast and the Strait of Juan de Fuca. A whale hunt and associated activities (such as monitoring, protests, law enforcement and weapons discharge) would be expected to result in increased noise levels in the project area. Sources of noise from hunt-related activities would include vessels and aircraft (noise would persist for the duration of each hunt) and firearms and explosive devices (noise would be intense and brief). Noise from automobile traffic would not be expected to increase at nearby properties as a result of implementing any of the action alternatives because daily and monthly traffic counts from the period of the previous hunts did not show an appreciable change in traffic volumes in the project area (Section 3.13.3.1.2, Vehicle Traffic Patterns During the 1999 Hunt).

It is possible that the number and types of vessels and aircraft participating in each hunting expedition (including observation, protests, law enforcement, and media coverage) would vary under the action alternatives. For example, alternatives that allow year-round hunting could attract more observers because of better weather conditions, or alternatives that allow more hunts might attract less media coverage as whale hunting becomes less of a novelty. Because of the difficulty of predicting such variations, and how they might affect the precise numbers of vessels and aircraft participating in each hunt, this analysis assumes each hunting expedition would be accompanied by the same amount of vessel and aircraft activity and associated noise. Vessels and aircraft associated with each hunt would likely be similar to those associated with the previous hunts, described in Section 3.11.3.2.2, Fishing Vessel Traffic. The noise level associated with vessels and aircraft under each alternative would depend on the number of days hunting associated with the alternative.

Weapons that may be used to strike and kill whales are described in Section 3.15.3.5.2, Weapons Associated with the Hunt. The Makah propose to strike and secure a whale with a hand-thrown toggle-point harpoon and to kill it with a .50-caliber rifle. An alternative method for striking a whale would be a hand-thrown darting gun with an explosive grenade. Alternative methods for killing a whale include explosive grenades delivered either by a hand-thrown darting gun or shoulder gun. If a shoulder gun were used, the blast would likely be louder than the noise associated with a rifle. The grenade is designed to detonate after entering the whale. Atmospheric noise from the detonation would be muffled by the surrounding tissue and by the water surrounding the whale and would probably not exceed the noise level of either the rifle or shoulder gun. Underwater noise from the grenade explosion, which would likely be intense, is discussed in Section 4.5, Other Wildlife. The amount of noise produced by weapons would depend on the number of whales that may be struck and killed under a given alternative.

4.11.2.2 Noise Levels at Receiving Properties

As a general rule of thumb, sound level in an open environment (such as occurs throughout the project area) drops 6 dB for every doubling of the distance from the noise source (Occupational Safety and Health Administration 1999). Thus, if a sound has an intensity of 100 dB 50 feet from the source (a standard distance for measuring noise output levels), the intensity at 100 feet would be 94 dB; at a distance of 1 mile, the sound level would be approximately 60 dB. Thus the potential for noise from hunt-related activities to affect sensitive receptors would depend primarily on the distance between the activities and the receptors. Any activities that occur closer to shore would be more audible than activities further offshore. For example, whale hunting during summer (under Alternatives 3, 5, and 6) may target whales that are feeding in the project area, and may therefore take place closer to shore than hunting during winter or spring, which may target migrating whales further offshore (Alternatives 2 and 4). In addition, most recreation visits occur during summer. Whale hunting activities during summer may be audible to more persons on trails and beaches in the Olympic National Park and the Makah Reservation, compared to activities at other times of year.

For firearms, the noise level at a receiving property would also depend on the direction the muzzle is facing at the moment of discharge, because gunfire noise is louder in the direction the weapon is pointed. Weapons discharged intentionally during a whale hunt would be pointed at a downward angle toward the whale:

> The rifleman on the chase board may not discharge his weapon until authorized to fire by a safety officer designated by the whaling captain. The safety officer would not authorize the discharge of the rifle unless the barrel of the rifle is above and within 30 feet from the target area of the whale and the rifleman's field of view is clear of all persons, vessels, buildings, vehicles, highways and other objects or structures that if hit by a rifle shot could cause injury to human life or property (2.3.3.2.7, Other Environmental Protection Measures).

It is reasonable to expect that the direction of fire would be away from commercial or residential areas.

As with the previous hunts, most hunting under the Alternatives 2 to 5 would probably take place 1 mile or more offshore in the Pacific coast portion of the U&A. Hunting under Alternative 6 would also likely occur in the coastal portion of the Makah U&A, but could also occur in the Strait of Juan de Fuca. For hunting in the coastal portion of the U&A, noise from vessels and weapons would be audible at few, if any, residential or commercial properties, including the Makah tribal Center. Recreational users of beaches in the OCNMS, the Makah Reservation, and the Olympic National Park would be most likely to hear noise associated with whale hunts under the action alternatives. Hunting activities that occur in the Strait of Juan de Fuca (i.e., under Alternative 6) may be audible at residential properties along State Route 112. Such noise would likely be masked by highway traffic noise, however.

Aircraft engaged in monitoring and law enforcement for the hunt would be audible primarily near vessels engaged in hunt-related activities or other vessels that might be in the vicinity of a hunt, such as recreational fishing vessels. Aircraft within OCNMS boundaries would be expected to observe the requirement to stay above an altitude of 2,000 feet. Increased noise levels from aircraft taking off and landing would also be audible at commercial and residential properties near the landing pad at Coast Guard Station Neah Bay. Media helicopters would likely arrive from other areas and would be present only near a successful harvest or major protest activity. Aircraft monitoring hunt-related activities that occurred outside the OCNMS (e.g., hunting in the Strait of

Juan de Fuca under Alternative 6, or events at Neah Bay under all action alternatives) would not have to maintain an altitude of at least 2,000 feet. For this reason, aircraft noise levels at receiving properties in Neah Bay and along State Route 112 would likely be louder than those along the Pacific coast portion of the U&A.

The area with greatest potential for disturbance from hunt-related activities under any of the action alternatives is Neah Bay, where most protests and law enforcement activities occurred during the previous hunts. If protest vessels moor at Clallam Bay, as they did during the previous hunts, increased noise levels would also be expected there and possibly along the travel route between Clallam Bay and Neah Bay.

4.11.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect sensitive noise receptors in the project area. For each alternative, the discussion addresses the potential number of occasions on which hunt-related activity may lead to elevated noise levels, as well as the likelihood that such noise would be detectable at sensitive sites.

The lowest risk of adverse effects on sensitive noise receptors would occur under the No-action Alternative, because no whale hunts would be permitted. The risk under the action alternatives would increase, with the amount of increase depending on the number of days of hunting and the number of rifle shots or grenade explosions. Table 4-1 identifies those numbers and Section 4.1, Introduction, describes the rationale for expecting those numbers. Compared to the No-action Alternative, the risk would increase under Alternatives 2 and 4 due to increases in aircraft and vessel noise over 7 to 30 days. The risk would increase further under Alternatives 3 and 6 due to increases in aircraft and vessel noise over 40 days. Alternatives 2, 3, 4, and 6 would all be expected to result in the same amount of increased risk from weapons discharge, compared to the No-action Alternative, because they include the same limits on the number of whales that may be struck and so would likely result in the same number of rifle shots (28) or grenade explosions (21).

Alternative 5 would also result in increased risk to sensitive noise receptors over the No-action Alternative due to increases in aircraft and vessel traffic over 20 days. This risk may be comparable to that under Alternatives 2 and 4, which would result in 7 to 30 days of hunting, and would be less than that under Alternatives 3 and 6, which would result in 40 days of hunting. Alternative 5 would carry the lowest risk from noise associated with weapons discharge because of the lower number of discharges (12 rifle shots and 9 grenade explosions).

4.11.3.1 Alternative 1

Under Alternative 1, no whale hunt would be permitted, and no whale hunting or associated activities would be expected to occur. The amount of noise-generating activity in the project area would not be expected to differ from current levels, and noise levels would not change from the current conditions described in Section 3.11.3.2, Existing Noise Levels.

4.11.3.2 Alternative 2

Under Alternative 2, vessel and aircraft noise associated with a hunt would be expected to occur on a total of 7 to 30 days, mostly during April and May. Also under Alternative 2, the limit on the number of struck whales would be seven and would potentially result in as many as 28 rifle shots or 21 grenade explosions annually. Compared to the No-action Alternative (under which there would be no hunt-related noise), the noise from vessels, aircraft and weapons discharge would result in increased noise levels at receiving properties in Neah Bay. There could also be increased noise levels at receiving properties along State Route 112, east of Neah Bay, from protest vessels traveling between Clallam Bay and Neah Bay.

In contrast to the No-action Alternative, increased noise from vessels, aircraft, and weapons associated with whale hunts under Alternative 2 may be audible to recreational users of the OCNMS, the Makah Reservation, and the Olympic National Park. The number of recreational visitors who may be affected would be limited, however, because hunting would be restricted to the winter and early spring months when visitation is comparatively low.

4.11.3.3 Alternative 3

Alternative 3 would include the same limits on the number of whales struck as Alternative 2, but would impose no restrictions on the hunting season. Under Alternative 3, vessel and aircraft noise associated with a hunt would be expected to occur on a total of 40 days; the limit on the number of struck whales would be seven and would potentially result in as many as 28 rifle shots or 21 grenade explosions. Compared to the No-action Alternative (under which there would be no hunt-related noise), the noise from vessels, aircraft and weapons discharge would result in increased noise levels at receiving properties in Neah Bay on a total of 40 days. There could also be increased noise levels at receiving properties along State Route 112, east of Neah Bay, from protest vessels traveling between Clallam Bay and Neah Bay. In addition, noise from vessels, aircraft, and weapons associated with whale hunts under Alternative 3 may be audible to recreational users of the OCNMS, the Makah Reservation, and the Olympic National Park, in contrast to the No-action Alternative, which would involve no hunt-related noise.

Compared to Alternative 2, Alternative 3 would be likely to result in a greater increase in noise levels at receiving properties because there would be more days of hunt-related vessel traffic (40 days compared to 7 to 30 days). Alternative 3 would result in about the same increase in noise levels from weapons discharge as Alternative 2 because it would impose the same limit on number of whales struck as Alternative 2, and thus result in the same number of rifle shots (28) and grenade explosions (21).

Alternative 3 has a greater potential to disturb recreational users in the project area than Alternative 2 because whale hunts would likely occur during the peak period of recreational use and may target whales that are feeding relatively close to shore (compared to whales that are migrating farther offshore at other times of year).

4.11.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2 and would impose the same restrictions on the hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to influence the potential for disturbance at residential or commercial properties or to recreational users in the project area. Therefore, the likely increase in noise at receiving properties under Alternative 4 would be the same as the likely increase under Alternative 2, relative to the No-action Alternative.

4.11.3.5 Alternative 5

Alternative 5 would include a limit of three struck whales and two harvested whales in any one year. Year-round hunting would be allowed. The expected number of hunting days would be 20 per year and the expected number of weapons discharges would be 12 rifle shots or 9 grenade explosions. Compared to the No-action Alternative (under which there would be no hunt-related noise), the noise from vessels, aircraft and weapons discharge would result in increased noise levels at receiving properties in Neah Bay and along State Route 112 east of Neah Bay on a total of 20 days. In addition, noise from vessels, aircraft, and weapons associated with whale hunts under Alternative 5 may be audible to recreational users of the OCNMS, the Makah Reservation, and the Olympic National Park, in contrast to the No-action Alternative, which would involve no hunt-related noise.

Compared to Alternatives 2 and 4, Alternative 5 might result in about the same number of days of hunting (20 compared with 7 to 30) and therefore a comparable increase in aircraft and vessel noise at receiving properties. Alternative 5 would result in a smaller increase in noise from weapons discharges, however, due to the smaller number of discharges. Compared to Alternative 3, Alternative 5 would result in fewer days of hunting (20 compared with 40) and fewer weapons discharges (12 rifle shots versus 28 and 9 grenade explosions versus 21) and would therefore result in a relatively smaller increase in noise.

Similar to Alternative 3, whale hunts under Alternative 5 would likely occur during summer (the peak period of recreational use) and may target whales that are feeding relatively close to shore (compared to whales that are migrating farther offshore at other times of year). For these reasons, Alternative 5 would have a greater potential than Alternatives 2 and 4 of disturbing recreational users in the project area.

4.11.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunting days year round, and the same number of weapons discharges, as Alternative 3. Therefore, compared to the No-action Alternative, the overall increase in noise from aircraft, vessels, and weapons discharge would likely be the same under Alternative 6 as under Alternative 3.

The ability to hunt in the Strait, however, might result in effects in different locations than would occur under Alternative 3, compared to the No-action Alternative. If tribal members chose to hunt in the Strait instead of the coastal portion of the Makah U&A, this could result in fewer instances of disturbance to recreational users of beaches and trails in the OCNMS, the Makah Reservation, and the Olympic National Park, compared to Alternative 3. It could also result in elevated noise levels at residential properties along State Route 112.

4.12 Aesthetics

4.12.1 Introduction

This section addresses the potential for the alternatives to result in adverse aesthetic effects on observers, based on the potential for viewers to see the whale hunt, either directly or through the media. Media images of the previous hunt prompted reactions ranging from revulsion to admiration. Analyses in this section consider the effects on observers who may be present at sites with direct views of a whale hunt (including views of a whale dying, being towed to shore, and/or being butchered), as well as those who may see such images through various media outlets. Whale hunting and related activities under the action alternatives would be short-term and localized, and would take place upon the water; such activities, therefore, would not affect natural visual resources in the project area, such as stacks, pillars, and islands (Section 3.12.3.1, Visual Resources in the Project Area).

4.12.2 Evaluation Criteria

Two criteria were used to determine the potential for aesthetic effects under the alternatives. The first is the anticipated number of persons who may be present at sites that may offer views of hunt-related activities, as well as their expectations (that is, whether individuals may encounter views of hunt-related activities without intending to do so). The second criterion includes the anticipated amount, intensity, duration, scope, and content of media coverage. The following two sections discuss these matters in greater detail and identify how the effects of the alternatives may be assessed and differentiated.

4.12.2.1 On-scene Observers

For each hunt, the number of interested observers (those who actively seek viewing opportunities out of concern about the outcome of the hunt) and persons engaged in monitoring, law enforcement, and media coverage would not be expected to vary under the action alternatives. The number of casual observers who could see hunt activity on the water (including pursuits, strikes, and possibly the death of a whale) would vary seasonally, with the greatest number of potential observers during the peak visitation period from June through September. The number of potential casual observers would also be expected to differ with the hunt area, as hunt-related activities in the Strait of Juan de Fuca may be visible to residents and travelers along State Route 112. Opportunities to view whale hunting in the Pacific coast portion of the Makah U&A would occur mostly from hiking trails and beaches, along with a limited number of road-based locations on the Makah Reservation (Section 3.12.3.2, Vantage Points and Viewing Opportunities). As with the previous hunts, most hunting under the action alternatives would be expected to take place 1 mile or more offshore in the Pacific coast portion of the U&A. Hunt activities would be visible from few, if any, land-based vantage points. Any activities that occur closer to shore would be more readily viewed. For example, whale hunting during summer (under Alternatives 3, 5, and 6) may target whales that are feeding in the project area, and may therefore take place closer to shore than hunting that targets migrating whales further offshore. Whale hunting activities during summer may be more readily seen by persons on trails and beaches in the Olympic National Park and the Makah Reservation.

The number of potential observers for a whale carcass being towed to shore and butchered would depend in part on the location of the beach to which the whale is brought. The whale that was harvested in 1999 was brought to Neah Bay, where butchering and harvest-related ceremonies and celebrations were readily observable by numerous tribal members, local residents, protesters, enforcement personnel, and media representatives. Alternative locations where a whale carcass may be brought to shore and butchered would likely be in far less prominent and accessible locations along the Pacific coast portion of the Makah Reservation. Under alternatives with no hunt timing restrictions, there would be a greater potential for recreational users of such areas to encounter views of a whale carcass without actively seeking such views.

The number of potential observers would also depend on the number of days of hunting, which in turn would depend primarily on the number of days of hunting. Table 4-1 identifies the number of days of hunting expected under each Alternative. The number of potential observers would depend on the season during which hunting occurs (more potential observers during summer), the location where hunting occurs (more potential observers in the Strait of Juan de Fuca than the coastal portion of the Makah U&A), the location where a whale carcass is brought to shore (more potential observers in the Strait of Juan de Fuca than the coastal portion of the Makah U&A), and the number of days of hunting (more hunts would create more opportunities for inadvertent viewing of hunt-related activities).

4.12.2.2 Media Viewers

As described in Section 3.12.3.3, Media Coverage of Previous Authorized Hunts, previous Makah whale hunts were the focus of intense coverage in local and regional newspapers, television broadcasts, and other media outlets. Stories and images of the hunt were also distributed nationwide and internationally. As with the previous hunts, media coverage would be expected to include images of hunt activities, protests, and public ceremonies and celebrations, as well as of a whale or whale being struck, killed, brought to shore, and butchered.

The amount of media coverage would depend on the amount of hunt-related activity, which in turn would depend primarily on the number of days of hunting. Table 4-1 identifies the number of days of hunting expected under each Alternative. It is possible that media coverage would be more intense for initial hunts, and would diminish as subsequent hunts occur. Even if that were to occur, alternatives with more days of hunting are still likely to result in more media coverage overall.

4.12.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to result in aesthetic effects on observers. For each alternative, the discussion addresses the potential number of on-scene observers who might view whale-hunting activities and the amount of media coverage.

The lowest risk of adverse aesthetic effects to casual observers would occur with the No-action Alternative, under which no whale hunts would be permitted. The No-action Alternative, however, would have adverse aesthetic effects on interested observers who desire to view a hunt. Under all of the action alternatives, interested observers could view a whale being hunted, towed to shore, or butchered from numerous points along the shoreline near Neah Bay and, to a lesser degree, the Pacific coast portion of the Makah U&A. Viewers not desiring to see a hunt, such as recreational users in the portions of the OCNMS, Olympic National Park, and Makah Reservation, may encounter views of hunt-related activities without expecting to do so (Section 3.12.3.2, Vantage Points and Viewing Opportunities).

4.12.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted, and no whale hunting or associated activities (e.g., ceremonies, celebrations, protests, law enforcement) would be anticipated. Therefore, there would be no potential to view hunt-related activities in the project area or through the media. With the possible exception of drift whales, no whale carcasses would be encountered by interested observers or recreational users of area beaches, trails, or campsites. Those desiring to view a hunt would not have the opportunity under this alternative.

4.12.3.2 Alternative 2

Under Alternative 2, whale hunting would be expected to occur over 7 to 30 days, most likely during April and May. Hunts might be visible to observers at beaches and vantage points along the Pacific coast portion of the project area. Hunt activities would take place during the winter and spring, when recreational use of these areas is typically lower than during the summer months. Compared to the No-action Alternative, under Alternative 2 there is an increased potential for recreational users to inadvertently encounter sights of a whale being hunted or towed to shore during a period of 7 to 30 days between December 1 and May 31. No hunting would be permitted within the Strait of Juan de Fuca, so there would be little potential for residents and travelers along State Route 112 on the Strait of Juan de Fuca to view a whale hunt.

As occurred in 1999 and 2000, whale hunts and associated activities (including protests and law enforcement) would likely receive extensive coverage in various media outlets. Public response would likely be substantial, expressing a wide range of opinions (Section 3.12.3.3, Media Coverage of Previous Authorized Hunts).

4.12.3.3 Alternative 3

Under Alternative 3, hunting would likely occur year round, with a likely total of 40 days of hunting. Hunts might be visible to observers at beaches and vantage points along the Pacific coast portion of the project area. Hunt activities would likely take place during the summer, when recreational use of these areas is highest. Thus compared to the No-action Alternative, under Alternative 3 there is an increased potential for recreational users to inadvertently encounter sights of a whale being hunted, towed to shore, or butchered during a period of 40 days throughout the year. No hunting would be permitted within the Strait of Juan de Fuca, so there would be little potential for residents and travelers along State Route 112 on the Strait of Juan de Fuca to view a whale hunt.

Compared to Alternative 2 there would be more days of hunting (40 versus 7 to 30) and therefore more opportunities for observers at beaches and vantage points along the Pacific coast portion of the project area to inadvertently view hunting activities. Also compared to Alternative 2, hunting would occur during the summer months, when recreational use of the project area is higher. Therefore, compared to the No-action Alternative, Alternative 3 is likely to have greater potential for observers to view hunt activities than alternative 2.

As occurred in 1999 and 2000, whale hunts and associated activities (including protests and law enforcement) would likely receive extensive coverage in various media outlets. Public response to media coverage would likely be substantial, with a variety and intensity of response similar to that described in Section 3.12.3.3, Media Coverage of Previous Authorized Hunts. Because there would be more days of hunting under Alternative 3 than under Alternative 2, Alternative 3 would likely result in a greater increase in the amount of media broadcasts over the No-action Alternative, compared to Alternative 2.

4.12.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2, and include the same hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to affect the number of days of hunting or the numbers of whales harvested. Therefore, the likely increase in adverse aesthetic effects under Alternative 4 would be the same as under Alternative 2, compared to the No-action Alternative.

4.12.3.5 Alternative 5

Under Alternative 5, hunting would likely occur year round, with a likely total of 20 days of hunting. Hunts might be visible to observers at beaches and vantage points along the Pacific coast portion of the project area. Hunt activities would likely take place during the summer, when recreational use of these areas is highest. Thus compared to the No-action Alternative, under Alternative 5 there is an increased potential for recreational users to inadvertently encounter sights of a whale being hunted or towed to shore during a period of 20 days throughout the year, including the heaviest periods of recreational use. No hunting would be permitted within the Strait of Juan de Fuca, so there would be little potential for residents and travelers along State Route 112 on the Strait of Juan de Fuca to view a whale hunt, although it is possible that pursuit of a struck whale could lead Makah hunters into the Strait.

Compared to Alternatives 2 and 4,, Alternative 5 would likely result in about the same number of days of hunting (20 versus 7 to 30), but hunting would occur during summer months when more recreational users would be present. Therefore, compared to the No-action Alternative, Alternative 5 is likely to have greater potential for observers at beaches and vantage points along the Pacific coast portion of the project area to inadvertently view hunting activities than the potential that exists under Alternatives 2 or 4.

As occurred in 1999 and 2000, whale hunts and associated activities (including protests and law enforcement) would likely receive extensive coverage in various media outlets. Public response to media coverage would likely be substantial, with a variety and intensity of response similar to that described in Section 3.12.3.3, Media Coverage of Previous Authorized Hunts. Because there would be about the same number of days of hunting under Alternative 5 as under Alternatives 2 and 4, Alternative 5 would likely result in about the same increase in media broadcasts as these Alternatives 2 and 4, as compared to the No-action Alternative.

Compared to Alternative 3, Alternative 5 would allow hunting throughout the year, but there would be about half as many days of hunting. Thus under Alternative 5, fewer on-site observers at beaches and vantage points along the Pacific coast portion of the project area would likely see a whale being hunted, brought to shore, or butchered, compared to Alternative 3. Because there would likely be fewer days of hunting under Alternative 5 than under Alternative 3, there would also likely be fewer media broadcasts.

4.12.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunting days year round as Alternative 3. The ability to hunt in the Strait, however, might result in effects in different locations than would occur under Alternative 3. If tribal members chose to hunt in the Strait instead of the coastal portion of the Makah U&A, this could result in residents and travelers along State Route 112 inadvertently viewing a whale being hunted, brought to shore, or butchered. If some hunting occurs in the Strait rather than the Pacific coast portion of the Makah U&A, the number of opportunities for on-site observers at beaches and vantage points to see a whale being hunted, brought to shore, or butchered would be less than anticipated under Alternative 3, because fewer whale hunts would likely occur in the coastal portion of the U&A. Thus compared to the No-action Alternative, Alternative 6 would result in about the same increase in inadvertent observations of whale hunting activities, but in different locations. Regardless of the location of hunting, the amount of media coverage would likely be similar under Alternatives 3 and 6, compared to the No-action Alternative. Public response to media coverage would likely be substantial, with a variety and intensity of response similar to those described in Section 3.12.3.3, Media Coverage of Previous Authorized Hunts.

Compared to Alternatives 2 and 4, it is likely that more observers on shore would see a whale being hunted, brought to shore, or butchered.

4.13 Transportation

4.13.1 Introduction

This section addresses the potential for a whale hunt and hunt-related activities in the project area to interfere with normal traffic patterns on highways, marine waters, and air routes near Neah Bay. In addition, analyses address the potential for changes in traffic patterns to result in an increased risk of traffic accidents or to impede access by emergency services.

4.13.2 Evaluation Criteria

For this analysis, transportation resources in the project area are subdivided into three categories – land, water, and air. Two criteria were used to determine the potential for effects on transportation under the alternatives. The first is the extent to which a particular alternative may affect traffic volumes or impede the movement of vehicles, vessels, or aircraft. Because each hunt would be expected to result in the same change in highway, marine, and air traffic volumes in the project area, the change in traffic would depend primarily on the amount of hunt-related activity. The amount of hunt-related activity would vary depending on the number of days that hunting occurs. Table 4-1 identifies the number of days of hunting expected under each alternative and Section 4.1, Introduction, describes the rationale for those numbers.

The analysis next considers whether changes in traffic patterns under each alternative might result in an increased risk of traffic accidents or might impede access by emergency services. An alternative would be more likely to result in problems if it impeded or created a substantial increase in traffic during a time of year when volumes were higher than average. The following sections describe the potential effects of each alternative on transportation, based on the extent and timing of traffic changes in each of the three categories.

4.13.2.1 Highway Traffic

It is unlikely that whale-hunt-related activities under the action alternatives would have a detectable effect on highway traffic volumes in the project area. Table 3-37 shows monthly averages of weekday traffic counts on Highway 101 near State Route 113. Average traffic counts for the months during which previous hunts or practice exercises took place (November 1998, May 1999, April 2000, and May 2000) are no higher than the 10-year averages for those months. For example, the average weekday traffic count for May 1999 was 2,572 vehicles, while the 1995-to-2004 average weekday count for May was 2,588 vehicles. In addition, there is no evidence of an increase in the number of collisions on project area highways during the years in which previous hunts or practice exercises took place (Table 3-38).

As noted in Section 3.13.3.1.2 (Vehicle Traffic Patterns during the 1999 Hunt), previous hunts affected highway traffic flow in the project area on one occasion when protesters and local police responding to them blocked traffic on State Route 112 for approximately 2.5 hours. The likelihood of a blockage occurring under the action alternatives cannot be predicted, but the potential for such an occurrence would be expected to increase with the number of days of hunting. Table 4-1 identifies the number of hunting days anticipated for each alternative. The intensity of any roadway blockage would depend on the time of year during which it occurred. Therefore, hunts during the peak travel season (June through September; Figure 3-11) would affect more travelers and have a greater risk of impeding emergency vehicles, compared to a blockage at other times of year. Summer is also the period with the greatest number of visitors to the Makah Reservation (Section 3.13.3.1.1, Typical Vehicle Traffic Volume Patterns). A road blockage during summer would also be expected to have a greater impact on access to the reservation than a blockage at other times of year.

4.13.2.2 Marine Traffic

Accounts from previous hunts indicated that protesters operated approximately 15 vessels near hunt activities, including Neah Bay and Sekiu (Section 3.15.3.4, Behavior of People Associated with the Hunt). There were no reports of whale hunting or protest vessels hindering the passage of commercial or recreational fishing vessels, or of marine accidents associated with hunt-related traffic. The incident in 2000, in which a protester on a jet ski collided with a Coast Guard vessel enforcing the MEZ, was a direct result of the actions of the parties involved, rather than a byproduct of increased traffic volume.

Hunt-related activities would be unlikely to interfere with commercial shipping traffic, because most (if not all) hunting would probably occur within the Coast Guard RNA, which lies almost entirely within the OCNMS area to be avoided. Commercial shipping traffic largely honors the area to be avoided (Section 3.6.3.1.4, Commercial Shipping) and would, therefore, be unlikely to encounter any hunt-related vessels. The only area where commercial shipping traffic could reasonably be expected to encounter hunt-related vessels is in the Strait of Juan de Fuca, because the area to be avoided does not extend eastward of Cape Flattery. Traffic lanes for commercial ships in the Strait are generally 3 to 4 miles from the northern shore of the Olympic Peninsula. Based on the experience of the whale hunts in 1999, most hunt activities would likely take place within 1 or 2 miles of shore, or possibly closer; vessels engaged in hunts, protests, media coverage, or law enforcement would not be likely to venture into the commercial shipping traffic lanes farther offshore. Hunts that take place during summer (under Alternatives 3, 5, or 6) would likely target whales that are feeding in the project area, and may therefore take place closer to shore than hunting that targets migrating whales further offshore (Alternatives 2 and 4). The likelihood for hunt-related traffic to interfere with commercial shipping traffic is very low, therefore, because most hunt activities would be unlikely to occur in commercial shipping lanes. Hunt-related activities in areas south of the traffic lanes would have the potential to interfere with slow-moving vessels, such as small fishing vessels and tugs with barges, which are allowed to transit eastbound and westbound south of the commercial traffic lanes.

While it is possible that vessels engaged in hunts, protests, media coverage, or law enforcement could interfere with vessels entering or leaving Neah Bay, the likelihood of such interference occurring under the action alternatives cannot be predicted. The potential for interference or marine accidents depend primarily on the number of days of hunting. Table 4-1 identifies the number of days of hunting expected under each Alternative. The potential for interference would also depend on the time of year that hunting occurs. As noted in Section 3.13.3.2, Marine Vessel Traffic, approximately 83 percent of all boat trips (commercial and recreational) from Neah Bay occur during the months of May through August. Less than 5 percent of all trips occur during the five-month period from November through March, and 5 percent occur during April. Hunt-related activities that occur during the summer peak period for marine traffic would have a greater potential to affect commercial or recreational fishing vessel traffic, compared to activities at other times of year. If the number of boat trips from Neah Bay continues to increase at a rate similar to what has been observed in recent years (Table 3-39), the likelihood of hunt-related vessel traffic interfering with other marine traffic (particularly recreational fishing trips) would likewise be expected to increase.

4.13.2.3 Air Traffic

There is no indication from accounts of previous hunts that law enforcement or media aircraft interfered with air traffic in the project area. The likelihood of such interference occurring under the action alternatives cannot be predicted, but the potential would be expected to increase each time a hunt takes place. Hunt-related activities that occur during a peak period for aircraft use would have a greater potential to affect air traffic, compared to activities at other times of year. No data are readily available to quantify seasonal differences in air traffic in the project area, but the peak period of aircraft use likely coincides with the summer months, when conditions of low wind and good visibility are relatively common.

4.13.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect transportation in the project area. For each alternative, the discussion addresses the anticipated increases in the volume or patterns of highway, marine, and air traffic in the project area, as well as changes in the risk of traffic accidents and the potential for highway blockages to interfere with emergency vehicles. The lowest risk of adverse effects on transportation would occur with the No-action Alternative, under which no whale hunts would be permitted and traffic volumes and patterns on highways, marine waters, and air routes near Neah Bay would not be expected to differ from their current levels. Under all of the action alternatives, elevated levels of marine and air traffic associated with whale hunts would have the potential to interfere with normal traffic patterns and could result in an increased risk of accidents. Although none of the alternatives is likely to increase the volume of highway traffic, it is possible there could be road blockages associated with protests and ensuing law enforcement responses, creating the possibility of traffic accidents or impediments to access by emergency services.

During each hunt, there would be an increased likelihood, relative to the No-action Alternative, that (1) protests and/or ensuing law enforcement responses could result in highway blockages, (2) vessels involved in the hunt, protests, media, and law enforcement could interfere with fishing or shipping traffic, or (3) aircraft involved in law enforcement or media coverage could interfere with other air traffic in the project area. The number of occasions on which this potential would exceed current conditions under the No-action Alternative would correspond to the number of days on which hunting would occur under a particular alternative.

The risk of adverse effects on transportation would also be related to the time of year in which whale hunting takes place. Alternatives that allow whale hunting during summer months would be more likely to affect commercial and recreational fishing boat trips from Neah Bay. Changes in traffic patterns as a result of highway blockages could have a greater effect during summer months, when traffic volumes are typically higher.

4.13.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted, and no whale hunting or associated activities (e.g., protests, law enforcement, media coverage) would be expected to occur. Traffic volumes in the project area would not be expected to differ from current levels. There would be no potential for hunt-related activities to interfere with highway, marine, or air traffic; result in an elevated risk of accidents, or impede access by emergency vehicles.

4.13.3.2 Alternative 2

Under Alternative 2, whale hunting would be expected to occur on a total of 7 to 30 days, primarily during April and May. Compared to the No-action Alternative, increased vessel and air traffic associated with whale hunts under Alternative 2 would result in an increased potential for interference with marine or air traffic in the project area and, possibly, an increased risk of accidents. Potential highway blockage resulting from protest activities and law enforcement response could result in traffic accidents or impediments to emergency vehicles. During each hunt, there would be an increased likelihood (relative to the No-action Alternative) that (1) protests and/or ensuing law enforcement responses could result in highway blockages, (2) vessels involved in the hunt, protests, media, and law enforcement could interfere with fishing or shipping traffic, or (3) aircraft involved in law enforcement or media coverage could interfere with other air traffic in the project area. These risks would occur on a total of 7 to 30 days, most likely during April and May, compared to no occurrences under the No-action Alternative.

Because whale hunting under Alternative 2 would be limited to the winter and early spring months, it would not overlap the peak periods for highway traffic. If most hunts take place during April and May, they would overlap the period during which there is a high volume of marine vessel traffic, particularly for recreational fishing. More boat trips from Neah Bay occur during the months of June through August, compared to May, however (Figure 3-12).

4.13.3.3 Alternative 3

Under Alternative 3, no seasonal restrictions would be imposed on whale hunting activities and hunting would be expected to occur throughout the year over 40 days. Compared to the No-action Alternative, increased vessel and air traffic associated with whale hunts under Alternative 3 would result in an increased potential for interference with marine or air traffic in the project area and, possibly, an increased risk of accidents. Potential highway blockage resulting from protest activities and law enforcement response could result in traffic accidents or impediments to emergency vehicles. During each hunt, there would be an increased likelihood (relative to the No-action Alternative) that (1) protests and/or ensuing law enforcement responses could result in highway blockages, (2) vessels involved in the hunt, protests, media, and law enforcement could interfere with fishing or shipping traffic, or (3) aircraft involved in law enforcement or media coverage could interfere with other air traffic in the project area. These risks would occur on a total of 40, most likely throughout the year.

Compared to Alternative 2, Alternative 3 would result in increased risks to transportation resources because there would be more days of hunting and because hunting would occur year round, including periods of greater highway, vessel and air traffic.

4.13.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2, and include the same hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to affect the hunting season or the number of days of hunting. Therefore, the likely increase in adverse transportation effects under Alternative 4 would be the same as under Alternative 2, compared to the No-action Alternative.

4.13.3.5 Alternative 5

Under Alternative 5, hunting would likely occur year round, with a likely total of 20 days of hunting. Hunt activities would likely take place during the summer, when highway, vessel and air traffic are highest. Thus compared to the No-action Alternative, under Alternative 5 there is an increased potential for adverse effects on transportation during a period of 20 days throughout the year. Potential adverse effects include interference with highway, marine, or air traffic in the project area and, possibly, an increased risk of traffic accidents or impediment with emergency vehicles. During each hunt, there would be an increased likelihood (relative to the No-action Alternative) that (1) protests and/or ensuing law enforcement responses could result in highway blockages, (2) vessels involved in the hunt, protests, media, and law enforcement could interfere with fishing or shipping traffic, or (3) aircraft involved in law enforcement or media coverage could interfere with other air traffic in the project area. Whale hunts during the summer months, when highway, marine, and air traffic volumes are typically higher than during other times of year, would have a greater potential to affect traffic, compared to activities at other times of year.

Compared to Alternatives 2 and 4, Alternative 5 would likely result in about the same number of days of hunting (20 versus 7 to 30), but hunting would occur during summer months when traffic volumes are higher. Therefore, compared to the No-action Alternative, Alternative 5 is likely to have greater adverse effects on transportation than Alternatives 2 or 4.

Compared to Alternative 3, Alternative 5 would result in half as many days of hunting (20 versus 40), during the same year-round period. Therefore, compared to the No-action Alternative, Alternative 5 is likely to have fewer adverse effects on transportation than Alternative 3.

4.13.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunting days year round as Alternative 3. The ability to hunt in the Strait might result in effects in different locations than would occur under Alternative 3, but would not be expected to have different effects overall compared to the No-action Alternative.

If tribal members chose to hunt in the Strait instead of the coastal portion of the Makah U&A, this could result in hunt-related vessel traffic in the Strait (including Makah vessels and associated protest, media, and law enforcement vessels). Such vessel traffic would not be likely to venture into commercial shipping traffic lanes and would therefore have a very low likelihood of interfering with the passage of commercial shipping vessels. Unlike any of the other alternatives (including No-action), hunt-related vessel traffic under Alternative 6 could impede or be impeded by slow-moving vessels, such as small fishing vessels and tugs with barges, south of the commercial traffic lanes in the Strait. Any instances of interference would likely occur over a matter of minutes or hours in a small area immediately adjacent to the hunting activity, and would not be likely to have appreciable effects on the ability of slow-moving vessels to pass through the Strait of Juan de Fuca.

4.14 Public Services

4.14.1 Introduction

This section addresses the potential for the alternatives to affect public services in the project area. This section analyzes the potential for a whale hunt and hunt-related activities to impede the ability of law enforcement to maintain order and medical professionals and facilities to treat injuries. Section 4.13, Transportation, discusses the potential for the alternatives to have transportation-related effects on access by emergency vehicles.

4.14.2 Evaluation Criteria

Two criteria were used to determine the potential for effects on public services under the alternatives. The first is the anticipated number of events requiring the attention of law enforcement personnel, and the second is the anticipated number of events requiring the attention of medical personnel.

4.14.2.1 Law Enforcement

Activities by protesters or counter-protesters could result in conflicts or legal infractions that would require intervention by law enforcement agents at sea or on land. A sudden, unanticipated increase in the number or frequency of such incidents could overwhelm the ability of local law enforcement personnel or facilities to respond. Even if such an occurrence were prevented through careful planning and coordination, hunt-related incidents could divert law enforcement resources from other missions. An increase in traffic incidents requiring law enforcement intervention could also divert law enforcement resources from other missions. Section 4.13.3, Transportation, Evaluation of Alternatives, also evaluates the potential for the alternatives to result in changes in traffic incidents, which could require law enforcement intervention or medical response.

As with the previous hunts, a law enforcement task force (Section 3.14.3.2, Police) would probably be assembled to ensure public safety during any whale hunts permitted under the action alternatives. The task force would coordinate county, state, federal, and tribal authorities' efforts to address any potential public disturbances related to whale hunts. Planning undertaken by the previous whale hunt task force included logistics (including assuring the availability of adequate staffing, equipment, and facilities), communications, interagency cooperation, crowd control, and establishment of incident command systems. Similar planning would most likely precede any whale hunts under the action alternatives, reducing the potential for hunt-related incidents to overwhelm law enforcement personnel or facilities.

As noted in Section 3.14.3.2, Police, the Clallam County Sheriff's Department did not find that the previous hunts and associated activities imposed a substantial burden on department staff. The reported increase in traffic stops by the Washington State Patrol on State Route 113 in 1999 could have been related to the Makah whale hunt, but it is not possible to determine from the available data whether that increase occurred before, during, or after the period of the whale hunt. There is no evidence of an increase in traffic volumes or the number of collisions on project area highways during the years in which previous hunts or practice exercises took place (Section 4.13.2.1, Evaluation Criteria, Highway Traffic). Because there is no clear indication of an increase in traffic stops or collisions with previous hunting activities, it is reasonable to conclude there would be no substantial increases in these rates in the project area under any of the alternatives.

During the previous Makah whale practice exercise in 1998 and hunts in 1999 and 2000, Coast Guard personnel were responsible for ensuring the safety of persons and vessels near the hunt, which included enforcing the moving exclusionary zone around Makah whale hunt vessels. The Coast Guard used helicopters, a cutter, and several utility boats and Zodiacs, and issued citations for negligent vessel operations, MMPA take violations, and violations of the moving exclusion zone (Section 3.14.3.1, Coast Guard). The Coast Guard would likely resume these activities under any of the action alternatives. In addition to participating in law enforcement activities, the Coast Guard would likely be the first to respond to any incidents requiring search and rescue in marine waters, for example, if a vessel capsized due to inclement weather or a collision. The risk of such events occurring would probably be greater under alternatives that restricted whale hunting to winter and spring (i.e., Alternatives 2 and 4), when adverse weather and sea conditions would more likely occur (Section 4.15.2.2, Injury from Boating Accidents). As noted in Section 3.14.3.1, Coast Guard, most search and rescue cases occur during the summer months, when sports fishers and tourists are present in greatest numbers. Under alternatives in which Makah tribal members could hunt year-round (i.e., Alternatives 3, 5, or 6), therefore, there would be a greater potential for a hunt-related boating incident to occur simultaneously with another incident requiring Coast Guard attention.

The potential for incidents requiring a law enforcement response would likely be similar for all hunt attempts. The risk of hunt-related incidents leading to law enforcement responses that overwhelmed the ability of local law enforcement personnel or facilities to respond would thus depend on the number of days hunting occurred. The severity of the effect on public services could vary according to the time of year the hunts occur. If law enforcement is diverted during periods when demand might be higher (such as during the busier summer season), the consequences of the diversion could be greater.

4.14.2.2 Medical Facilities

As noted in Section 4.15 (Public Safety), hunt-related activities might result in injuries from boating accidents, mishaps with weapons, violence associated with protests, or possible traffic accidents. A sudden influx of persons requiring medical attention could exceed the physical or technical capacities of tribal and other local public health facilities. Additional trauma care facilities are available nearby. They include a Level 3 trauma care facility in Port Angeles and a Level 1-2 facility in Seattle. During the spring 2000 hunt, one protester sustained a shoulder injury and was transported to Port Angeles for medical care (Section 3.15.3.4, Behavior of People Associated with the Hunt).

The potential for injuries requiring medical attention would likely be similar for all hunt attempts, though hunt attempts during inclement weather might increase the risk of boating accidents for both protesters and hunters (Section 4.15.2.2, Injury from Boating Accidents). The risk of injury associated with any given alternative would, therefore, depend mainly on the number of hunt attempts that took place and also on the seasonal restrictions on hunting (that is, the ability of the Tribe to hunt year-round and, therefore, choose hunting opportunities with better weather conditions).

4.14.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect public services in the project area. For each alternative, the discussion addresses the anticipated change in the number of incidents requiring law enforcement intervention and injuries requiring medical attention.

The lowest risk of adverse effects on public services would occur under the No-action Alternative, because no whale hunts would be permitted, and the need for law enforcement and medical attention in the project area would not be expected to differ from current levels. Under all of the action alternatives, protests and other activities associated with whale hunts would have the potential to divert law enforcement resources from other missions. Hunt-related activities could also result in an increase in the number of injuries, exceeding the capabilities of local health facilities. This potential might be lower under Alternatives 2 and 4 (with an estimated 7-30 days of hunting) compared to Alternatives 3 and 6 (with an estimated 40 days of hunting). In addition, hunting under Alternatives 2 and 4 would be limited to periods when the number of recreational visitors in the project area is comparatively low, reducing the likelihood that hunt-related incidents might occur when public services resources were engaged elsewhere. On the other hand, hunt attempts under Alternatives 3 and 6 would probably occur in better weather conditions, reducing the risk of boating accidents.

Alternative 5 would result in an estimated 20 days of hunting, about the same as Alternatives 2 and 4 (7 to 30 days) and about half as many days as Alternatives 3 and 6. Alternative 5 would also allow hunting year-round, likely resulting in hunts occurring during the summer. Summer hunts would have a reduced risk of boating accidents, but would also occur during a busier time of year when law enforcement and medical services are more likely to be engaged elsewhere.

4.14.3.1 Alternative 1

Under the No-action Alternative, no whale hunt would be permitted, and no whale hunting or associated activities (e.g., protests, law enforcement) would be expected to occur. The need for law enforcement and medical services in the project area would probably not differ from current levels. There would be no potential for injuries or incidents associated with hunt-related activities to overwhelm personnel and facilities or divert resources away from other duties. As under current scenarios, any persons who sustained injuries unrelated to hunt activities exceeding the physical or technical capacities of local public health facilities could be transported to other facilities in the region.

4.14.3.2 Alternative 2

Under Alternative 2, whale hunting would be expected to occur on a total of 7 to 30 days, primarily during April and May. Compared to the No-action Alternative, protest activities associated with whale hunts under Alternative 2 could result in an increased number of incidents requiring law enforcement intervention on those days, possibly diverting law enforcement resources from other missions. If a law enforcement task force were implemented, similar to previous hunts, protests or other activities would probably not overwhelm the combined personnel and facilities of county, state, federal, and tribal authorities.

Similarly, Alternative 2 could result in injuries requiring medical assistance during the expected 7 to 30 days of hunting. The increased risk of injuries over current conditions under the No-action Alternative could result in an increased risk of exceeding the capabilities of local health facilities. Whale hunting would be limited to the winter and early spring months, outside the period when most search and rescue cases typically occur but also during a period when weather and sea conditions can contribute to boating accidents. If hunt-related activities resulted in injuries that exceeded the physical or technical capacities of local public health facilities, persons requiring medical attention could be transported to other facilities in the region.

4.14.3.3 Alternative 3

Under Alternative 3, no seasonal restrictions would be imposed on whale hunting activities and hunting would be expected to occur on a total of 40 days throughout the year. Compared to the No-action Alternative, activities associated with whale hunts under Alternative 3 could result in an increased number of incidents requiring law enforcement intervention on those days, possibly diverting law enforcement resources from other missions. If a law enforcement task force were implemented, similar to previous hunts, protests or other activities would probably not overwhelm the combined personnel and facilities of county, state, federal, and tribal authorities.

Similarly, Alternative 3 could result in injuries requiring medical assistance during the expected 40 days of hunting. The increased risk of injuries over current conditions under the No-action Alternative could result in an increased risk of exceeding the capabilities of local health facilities. Whale hunting would occur year round, including during the summer period when most search and rescue cases typically occur. If hunt-related activities resulted in injuries that exceeded the physical or technical capacities of local public health facilities, persons requiring medical attention could be transported to other facilities in the region.

Compared to Alternative 2, more opportunities for hunting would be expected to result in a greater number of hunting expeditions, with an attendant increase in the potential for diverting law enforcement resources from other missions, or for causing injuries that require medical attention. Because hunting would be allowed year-round, a greater proportion of hunt attempts would likely take place during summer, when the risk of boating accidents due to inclement weather would be lower than during other times of year. On the other hand, hunting under

Alternative 3 could occur during the busier summer season, when law enforcement and medical services are more likely to be engaged elsewhere.

4.14.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2, and include the same hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to affect the hunting season or the number of days of hunting. Therefore, any increase in incidents requiring the services of law enforcement or medical personnel are likely to be the same under Alternative 4 as under Alternative 2, compared to the No-action Alternative.

4.14.3.5 Alternative 5

Under Alternative 5, hunting could occur year round, with a likely total of 20 days of hunting. Hunt activities would likely take place during the busier summer season, when law enforcement and medical services are more likely to be engaged elsewhere. Thus compared to the No-action Alternative, under Alternative 5 there is an increased potential for adverse effects on public services during a period of 20 days throughout the year.

Compared to Alternatives 2 and 4, Alternative 5 would probably result in about the same number of days of hunting (20 versus 7 to 30). Under Alternative 5, however, hunts would be likely to occur during the busier summer season, when law enforcement and medical services are more likely to be engaged elsewhere. On the other hand, hunts during the summer would be less likely to result in injuries from boating accidents.

Compared to Alternative 3, Alternative 5 would result in fewer days of hunting (20 versus 40) and therefore fewer occasions on which hunt-related activities might divert law enforcement resources from other missions or result in injuries that require medical attention. Because hunting under either Alternative could occur year-round, each hunting expedition under the two alternatives would have a similar potential to result in boating accidents or to occur during the busy summer season when law enforcement and medical services are more likely to be engaged elsewhere.

4.14.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of hunting days year round as Alternative 3. The ability to hunt in the Strait might result in effects in different locations than would occur under Alternative 3. As noted in Section 4.15.3, Public Safety, Evaluation of Alternatives, hunting whales in the Strait would not be expected to pose any additional risks of injury through boating accidents, compared to hunting in the coastal portion of the U&A. Similarly, hunting in the Strait would not be expected to result in any additional potential for law enforcement intervention, compared to Alternative 6 would probably not differ from the potential under Alternative 3 and would have the same effects compared to the No-action Alternative.

4.15 Public Safety

4.15.1 Introduction

This section addresses the potential for a whale hunt and hunt-related activities in the project area to affect public safety. Persons whose safety may be affected by whale hunt-related activities are divided into three groups: hunters and other participants (such as official observers, members of the media, and law enforcement personnel), protesters, and bystanders. Bystanders on the water may include recreational and other boaters; bystanders on land may include Makah tribal members at protests, tourists, or motorists. Individuals from any of these groups could be injured by weapons, boating accidents, or protests and related activities (such as civil disobedience or law enforcement actions). This section examines how the potential for those types of injuries might vary depending on the time of year and location of any hunt and on the frequency of any hunting.

4.15.2 Evaluation Criteria

Three criteria were used to determine the potential for effects on public safety under the alternatives, based on the ways in which injury may occur as a result of any proposed gray whale hunt. These include injuries from weapons (harpoon, rifle or explosive grenade), from boating accidents (including those associated with protest activities on the water), or from land-based protest activities.

With the exception of injuries related to adverse weather or sea conditions, the risk of injury would likely be equal for each hunt attempt. The risk of injury associated with any given alternative would, therefore, depend on the number of days of hunting and the time of year the hunts occur. Table 4-1 identifies the expected number of days of hunting under each alternative. Alternatives under which more hunts would occur would probably result in greater risk of injury to hunters, protesters, and bystanders. Alternatives that limit hunting to the winter and spring period would probably result in greater risk of injury than alternatives that allowed hunting year round. The following sections discuss the risk of each type of injury for each of the groups that may be affected.

4.15.2.1 Injury from Weapons

Under current conditions, no whale hunting is authorized and no weapons are used in the project area to kill whales. Some level of hunting currently exists but the number of injuries associated with weapons accidents in hunting is unknown. Under any of the action alternatives, hunters and other participants would be at the greatest risk of injury from weapons because they would be handling weapons; protesters and bystanders would experience a lesser risk. The possibility of any persons being struck by a bullet or shoulder-fired explosive projectile would be minimized by proposed safety requirements that would include, among other things, the Coast Guard navigational restrictions (Section 3.1.1.3, Coast Guard Regulated Navigation Area), hunter training, visibility requirements, and a lookout to determine when the shooter would have a clear line of fire at a whale (Section 2.3.3.2.7, Other Environmental Protection Measures).

The risk of injury to any group of individuals from weapons would most likely depend on the number of whales that could be struck. Table 4-1 identifies the number of whales that may be struck under each Alternative. It would also depend on the season during which hunting occurs. Hunts that takes place during the winter and spring months may have the greater potential to result injury from weapons. This is because the limited hunting season would include periods of rougher weather and sea conditions, which might hamper the accuracy of hunters using harpoons, rifles, or explosive projectiles. Less accurate strikes might result in greater risk of injury to hunt participants, protesters, and bystanders.

Hunters and Other Participants

Hunters using a toggle-point harpoon could be cut by the harpoon tip or struck with the shaft. Hunters using either a harpoon or an explosive projectile as the primary weapon for striking the whale could become tangled in the line. Hunters using an explosive projectile either as the primary or secondary hunting weapon (launched either from a darting gun or shoulder gun) could be injured if the grenade exploded prematurely. There would be a greater risk with black powder grenades, where the fuse would be lit before the grenade was fired (Section 3.15.3.5.2, Weapons Associated with the Hunt). The fuse on penthrite grenades would not be lit until the projectile entered the whale, reducing the risk of hunter injury from premature detonation (Section 3.15.3.5.2, Weapons Associated with the Hunt). Hunters using a rifle as the secondary weapon for killing a whale could potentially be injured from the rifle recoiling or misfiring; hunters could also be struck directly or by ricochet with a .50 caliber bullet.

Weapons also present the potential for injury to other participants, such as members of the media, hunt observers, and enforcement officials. Such individuals could be exposed to many of the same potential injuries from weapons as hunters, but they would be less likely to be injured by a harpoon, premature detonation of grenades, or rifle recoil. Such injuries are more likely to be associated with handling a weapon.

Protesters

Protesters would face a lower risk than hunters of being injured by weapons misfiring, because protesters would not likely be handling weapons. Records of the 1999 and 2000 protests do not show that protesters possessed weapons. Protesters who attempt to interfere with a hunt by positioning their vessels between whales and hunters could be struck by a harpoon, bullet, or explosive projectile. Protesters might also sustain injuries if their vessels were struck by a projectile.

Bystanders

Recreational boaters and other potential bystanders would probably not encounter hunting activities under the action alternatives because of the large size of the hunting area, its remoteness, the presence of the Coast Guard MEZ. Any recreational boaters who encountered hunting activities would likely avoid them. Because they would probably not be near the hunt, bystanders on the water would most likely not be injured by weapons. It is extremely unlikely that bystanders on land would be exposed to injury from weapons under the action alternatives, because any hunt would probably occur hundreds to thousands of yards from shore and the tribe would adhere to weapon discharge procedures (e.g., visibility and shot distances) expected to constrain the area of potential danger to the immediate vicinity of the whale being pursued (Beattie 2001; Graves et al. 2004; Makah Tribe 2005a).

4.15.2.2 Injury from Boating Accidents

Under current conditions, no whale hunts are authorized and no vessel activity associated with whale hunts occurs. There is a considerable amount of commercial and recreational vessel activity in the area, and likely some boating accidents occur, though the current rate is not known. Under any of the action alternatives, boating accidents might result from protest activities on the water, the actions of a wounded whale, or adverse weather and sea conditions. Any type of boating accident could result in traumatic injury, drowning, or hypothermia. The risk of individuals being injured in a boating accident associated with protester activities would be reduced by the Coast Guard navigational restrictions (Section 3.1.1.3, Coast Guard Regulated Navigation Area); to the extent protesters obeyed those restrictions.

The risk of injury to any group of individuals from boating accidents would most likely depend on the number of days of hunting. Table 4-1 identifies the number of days of hunting expected to occur under each Alternative. It would also depend on the season during which hunting occurs. Hunts that takes place during the winter and spring months may have the greater potential to result injury from boating accidents. This is because the limited hunting season would include periods of rougher weather and sea conditions, which might increase the potential for boating accidents compared to hunts that occur during milder weather and calmer seas. Accidents caused by the behavior of protestors on the water, the behavior of a wounded whale, or as a result of attempting to tow a whale to shore, are considered as boating accidents.

Hunters and Other Participants

Protesters on small vessels, jet skis, and a small submarine accompanied the 1999 and 2000 hunts (Section 3.15.3.4, Behavior of People Associated with the Hunt). Some protesters attempted to interfere with the hunt by placing their vessels between whales and hunting vessels, charging hunting vessels, or harassing whales to make them move away from hunting vessels (Section 3.15.2.4, Behavior of People Associated with the Hunt). This type of vessel operation could cause boating accidents involving hunters or other participants. No hunters or other participants were injured due to actions of protest vessel operators during the 1999 and 2000 hunts.

An injured whale could also cause a boating accident. Once a whale was harpooned, the wounded whale might ram or otherwise strike boats. A harpooned whale might also swamp the canoe by swimming away or diving (Section 3.4.3.5.3, Whale Response to Being Struck). The risk of injury to hunters and other participants by a wounded whale would be reduced by the use of a secondary hunting weapon (either a .50 caliber rifle as proposed or an explosive projectile launched from a darting gun or shoulder gun). This secondary weapon would most likely kill a wounded whale within minutes of a harpoon strike.

A boating accident could also result if boats became unstable, swamped, capsized, or struck other boats, especially during rough weather or high seas conditions. A boat towing a whale to shore could also become unstable because of the size and weight of the whale. This type of risk would be reduced under alternatives in which the Makah could hunt year-round (Alternatives 3, 5, or 6).

Under that scenario, the Tribe would have a greater opportunity to choose hunting days depending on weather and sea conditions.

Protesters

Persons operating vessels engaged in protests would face an elevated risk of injury from boating accidents. As described under Hunters and Other Participants, above, protest vessel operators may place themselves at an elevated risk of injury. For example, in 2000 one jet ski operator entering the MEZ collided with a Coast Guard vessel and sustained a shoulder injury (Public Safety, Section 3.15.3.4, Behavior of People Associated with the Hunt).

An injured whale could also cause a boating accident, as could adverse weather and sea conditions, as described under Hunters and Other Participants. The risk of injury from a wounded whale would probably be lower for protesters than for hunters, as hunters would likely be closer to injured whales. As noted above, the risk of injury from a wounded whale would decline if a secondary hunting weapon were used. Similarly, the risk of boating accidents due to weather and sea conditions would be less under alternatives allowing the Makah to hunt year-round.

Bystanders

As described above in the discussion regarding bystanders and weapons injuries, bystanders on the water probably would not be close enough to the hunting area to be injured in a boating accident related to protest activities or a wounded whale. The potential for recreational boaters to sustain injury due to adverse weather or sea conditions would be independent of the presence or absence of hunt-related activities under any of the alternatives.

4.15.2.3 Injury from Land-based Protest Activities

Under current conditions, no whale hunts are authorized and no whale-hunting protests occur. There are presently no known incidents of other forms of organized civil disobedience in the area. Under the action alternatives, protesters might stage protests on the road leading to the Makah Reservation, on or near the reservation itself, or on the water around the hunt. Potential risks associated with water-based protests are addressed in Section 4.15.2.2, Injury from Boating Accidents. During the 1999 and 2000 hunts, demonstrators on the Makah Reservation exchanged insults with tribal members, including hunters (Section 3.15.3.4, Behavior of People Associated with the Hunt). The risk of individuals being injured as a result of protest activities on land would be minimized by implementation of an enforcement management plan similar to that applied during previous hunts.

The risk of injury to any group of individuals from protest activities would most likely depend on the number of days of hunting. Table 4-1 identifies the number of days of hunting expected to occur under each alternative.

Hunters and Other Participants

Protest activities on land might expose hunters and other participants (including law enforcement personnel) to increased risk of injury. No hunters or other participants were injured during the 1999 and 2000 hunts because of protests on land.

Protesters

Protesters might face an elevated risk of injury from the actions of law enforcement personnel, protesters, or counter-protesters. In one incident during the 1998 practice whale hunt exercise, a protester was pushed from a dock, but did not sustain injury. There was also an instance of Makah youth throwing rocks at protester vessels, causing no injury, but damaging a vessel windshield (Section 3.15.3.4, Behavior of People Associated with the Hunt). No protesters were seriously injured during the 1999 and 2000 hunts because of protests on land.

Bystanders

For this analysis, Makah tribal members and non-members who are not actively engaged as hunt participants are considered bystanders, along with persons who are not engaged in protests. During the 1999 and 2000 protests, some tribal members not involved in the hunt engaged protesters, and there were some altercations, although no one was seriously injured (Section 3.15.3.4, Behavior of People Associated with the Hunt). Bystanders might approach protest scenes as onlookers, or could be drawn into protests, with an attendant increase in the risk of personal injury.

4.15.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives to affect the safety of hunters and other participants, protesters, and bystanders. For each alternative, the discussion addresses the anticipated change in the number of injuries resulting from weapons, boating accidents, or protest activities.

The lowest risk of adverse effects to public safety would occur under the No-action Alternative because no hunting would occur and there would be no associated protest activities. Alternatives 3 and 6), with the greatest number of whales harvested and greatest number of days of hunting, would result in the greatest risk to public safety from weapons, boating accidents, and protest activities, compared to the No-action Alternative. Alternatives 2 and 4 would allow the same number of whales harvested as Alternatives 3 and 6, but would probably result in fewer days of hunting (20 days versus 40), and therefore less risk of injury from protest activities. Hunting under Alternatives 2 and 4 would be limited to periods of worse weather and rougher seas than Alternatives 3 and 6 and would therefore pose greater risks of injury from weapons and boating accidents. Conversely, the fewer days of hunting under Alternatives 2 and 4 would result in less risk of injury from boating accidents than under Alternatives 3 and 6. Alternative 5 would likely have the least potential for injury of all the action alternatives. Although Alternative 5 would include approximately the same number of days of hunting as Alternatives 2 and 4 (20 days versus 7 to 30), hunting could occur any time of year, creating greater opportunity for the Tribe to choose hunting days with safer weather and sea conditions.

4.15.3.1 Alternative 1

Currently no whale hunting occurs in the project area, so there are no accidents related to whale hunting. Recreational boaters, commercial and recreational fishers, and commercial vessels currently use the project area (Section 3.13.3.2, Marine Vessel Traffic) and there is likely currently some level of injury associated with boating, although the amount is unknown. Hunting also currently occurs in the project area (Table 3-29) and there is likely currently some level of injury from weapons associated with hunting, although the amount is unknown. Under the No-action Alternative, there would be no increased risk of injury to individuals beyond those levels that occur under current conditions.

4.15.3.2 Alternative 2

Under Alternative 2, whale hunting would be expected to occur on a total of 7 to 30 days, primarily during April and May. Up to seven whales could be struck annually under this alternative. Compared to the No-action Alternative (under which there would be no whale-hunt-related injuries), there would be an increased risk of injury from weapons, boating accidents and protest activities in the project area on each day that hunting occurred. Hunting during April and May would include periods of inclement weather and rough sea conditions, which could contribute to accidents involving weapons or boats.

4.15.3.3 Alternative 3

Under Alternative 3, there would be no seasonal restrictions on whale hunting activities and hunting would be expected to occur year round. Up to seven whales could be struck annually under this alternative. Compared to the No-action Alternative, weapon use, boating accidents and protest activities could result in increased risk of injury to hunters and other participants, bystanders, and protesters.

Compared to Alternative 2 there would be more days of hunting under Alternative 3 (40 versus 7-30) and therefore greater risk or injury from boating accidents and protest activities. Alternative 3 would allow the same number of whales struck as Alternative 2 and therefore would result in the same risk of injury from weapons (although under Alternative 2 it is possible that the restrictions on hunting seasons and harvest of identified whales could make it more difficult to achieve the full harvest level). Conversely, the ability to hunt during better weather conditions under Alternative 3 might reduce the potential associated with each hunt for injury from weapons and boating accidents due to unfavorable weather and sea conditions.

4.15.3.4 Alternative 4

Alternative 4 would include the same limits on the number of whales harvested as Alternative 2, and include the same hunting season. The additional restrictions contained in Alternative 4 (no hunting within 200 yards of rocks and islands in the Washington Islands National Wildlife Refuges) would not be expected to affect the number of whales struck, the hunting season or the number of days of hunting. Therefore, the likely increase in risk of injury to individuals is likely to be the same under Alternative 4 as under Alternative 2, compared to the No-action Alternative.

4.15.3.5 Alternative 5

Under Alternative 5, hunting would likely occur year round, with a likely total of 20 days of hunting. The number of whales struck would be limited to three. Hunt activities would likely take place year round. Thus compared to the No-action Alternative, under Alternative 5 there is an increased risk of injury from weapons, boating accidents and protest activities associated with hunting over 20 days throughout the year and with striking of three whales.

Compared to Alternatives 2 and 4, Alternative 5 would probably result in about the same number of days of hunting (20 versus 7-30) and therefore the same potential for injuries from boating accidents and protest activities. Under Alternative 5, however, fewer whales could be struck than under Alternatives 2 and 4 (three whales versus seven), so there would be less potential for injury from weapons. Alternative 5 would also allow hunting year round, reducing the potential for injury from weapons and boating accidents that could be associated with the worse weather and sea conditions likely under Alternative 2.

Compared to Alternative 3, Alternative 5 would result in fewer days of hunting (20 versus 40) and therefore a lower potential for injuries from boating accidents and protest activities.

Alternative 5 would also result in less risk of injury than Alternative 3 because fewer whales could be struck under Alternative 5 (three whales versus seven). Both alternatives would allow year round hunting, so risks of injury from weapons and boating accidents would not be different based on weather and sea conditions.

4.15.3.6 Alternative 6

Alternative 6 would include the same provisions as Alternative 3 except that hunting would also be allowed in the Strait of Juan de Fuca portion of the Makah U&A. Alternative 6 would be expected to result in the same number of whales struck and the same number of hunting days year round as Alternative 3. The ability to hunt in the Strait, however, might result in effects in different locations than would occur under Alternative 3, compared to the No-action Alternative. Hunting whales in the Strait would not be expected to pose any additional risks of injury from boating accidents or protest activities, compared to hunting in the coastal portion of the U&A. under Alternative 3. Therefore, risks of injuries from these sources would likely be the same under Alternative 6 as under Alternative 3, compared to the No-action Alternative.

If tribal members chose to hunt in the Strait, with the highway running close to the coastline over a portion of this area, risks to bystanders on land from weapons injuries would increase slightly compared to Alternative 3, and thus compared to the No-action Alternative, because of the potential for a stray bullet or grenade. The increased risk would be slight because of the small number of bullets (28) or grenades (21) expected to be fired, the low traffic volumes on the highway, and the safety measures proposed.

4.16 Human Health

4.16.1 Introduction

This section addresses the potential for the alternatives to affect human health of the Makah Tribe in the project area. Three issues pertain to human health and whale hunt-related activities: (1) the potential nutritional benefits associated with consuming whale food products, (2) the potential for exposure to contaminants in food items from whale harvests, and (3) the potential for exposure to food-borne pathogens in food items from whale harvests. Based on the information available for this analysis, all of the alternatives would have a reasonably foreseeable potential to affect human health both positively and negatively. There are too many uncertainties, however, to quantify either type of effect or to predict whether any of the alternatives would result in a net positive or negative effect on human health. The following sections discuss these points in greater detail.

4.16.2 Evaluation Criteria

Three criteria were used to determine the potential for effects on human health. The first is the change in nutritional benefits the Makah Tribe could experience under any of the alternatives. The second is the amount of environmental contamination tribal members might be exposed to as a result of consuming gray whale products. The last is the extent Makah tribal members would be exposed to food borne pathogens as a result of processing and consuming whale products.

4.16.2.1 Nutritional Benefits

As described in Section 3.16.3.1, Nutritional and Health Benefits from Consuming Whale Food Products and Other Traditional Subsistence Foods, marine mammal tissues were an historically important nutritional component of the Makah diet (Renker 2002). Marine mammal tissues, including large whales, contain vitamins, essential elements, and both essential and beneficial polyunsaturated fatty acids (United States Department of Agriculture 2005). These items are present in other foods (e.g., fish, shellfish, nuts, and vegetable oils), but in some cases are present in higher concentrations in marine mammal food products (e.g., polyunsaturated fats). Documented benefits of consuming essential fatty acids present in whale and fish food products include prevention or alleviation of symptoms associated with diabetes, kidney disease, heart disease, hypertension, and other similar health problems (Budowski 1988; Simopoulos 1999; Simopoulos 2002; Holub and Holub 2004; Ebbesson 2005b, c; Reynolds et al 2006). In addition, whale products provide a good source of antioxidants (vitamin E) and selenium, which play a role in protecting against some contaminants (e.g., mercury) (Arnold and Middaugh 2004). Whale-derived food products are a source of minerals and vitamins that have well-documented nutritional benefits to populations consuming them.

There are no specific studies that compare the types and concentrations of nutrients in food products obtained from the drift whales occasionally consumed by the Makah with those found in the fresh gray whale food products that would be available to them under Alternatives 2 through 6. Whether consuming freshly harvested gray whale food products would affect the level of nutrition available to Makah tribal members would depend largely on the types and levels of nutrition present in an individual tribal member’s existing diet relative to several factors: (1) what part(s) of the whale and how much of each would be consumed, (2) what currently consumed food items (and associated nutritional levels) would be replaced by gray whale food products, and (3) how each food item would be collected, stored, and prepared for consumption. None of this information is currently available.

4.16.2.2 Environmental Contaminants

As described in Section 3.16.3.2, Environmental Contaminants in Gray Whales, gray whale tissues contain chemical contaminants that Makah tribal members would be exposed to if they consumed fresh gray whale food products generated from a successful hunt. Similar contaminants are present in the foods that Makah tribal members typically consume, including fish and shellfish from the project area as well as store-purchased food products. There are no data to compare the amount of contaminants currently being consumed by the Makah Tribe from its normal food sources with the amount of contaminants found in fresh whale products, making it difficult to determine the net change in contaminants to which tribal members would be exposed. Furthermore, data do not exist to indicate the amount of fresh whale food products an individual Makah member may consume in lieu of other food sources normally consumed by the same individual. As a result of this lack of data, it is not possible to discern risk levels based upon the existing best available information addressing the rate of consumption and method of cooking fresh whale tissues by Makah tribal members.

There are no specific studies that compare the types and concentrations of contaminants in food products obtained from the drift whales occasionally consumed by the Makah with those found in the fresh gray whale food products that would be available to them under Alternatives 2 through 6. Whether consuming freshly harvested gray whale food products would affect contaminant exposure in Makah tribal members would depend largely on the types and levels of contaminants present in an individual tribal member's existing diet relative to several factors: (1) what part(s) of the whale and how much of each would be consumed, (2) what currently consumed food items (and associated contaminants) would be replaced by gray whale food products, (3) the age and sex of the whale, (4) possibly the time of year and body condition of the whale, and (5) how each food item would be collected, stored, and prepared for consumption. None of this information is currently available.

4.16.2.3 Exposure to Food-Borne Pathogens

As described in Section 3.16.3.3, Exposure to Food-Borne Pathogens, exposure to food-borne pathogens might result from improperly handled food items. While exposure to pathogens associated with the consumption of whale products has been documented, it is not unique to consumption of whale food products. Pathogenic organisms (e.g., bacteria, viruses, and parasites) are common in other subsistence and store-purchased foods such as seafood, poultry products, meat products, dairy products, and vegetables. Any of these products could cause illness if they were improperly butchered, stored, or prepared. Thus under current conditions, there is some degree of risk to Makah tribal members of contracting food-related illness from exposure to pathogens. Changes in the quantity of freshly harvested whale consumed would probably not appreciably change the potential for food-borne illness to occur in Makah tribal members, assuming they followed the same general food storage and preparation practices for whale products as for other food products.

4.16.3 Evaluation of Alternatives

Three evaluation criteria were used to compare the alternatives relative to human health: (1) potential change in the level of exposure to contaminants, (2) potential change in the level of exposure to food-borne pathogens, and (3) potential change in the nutritional composition of the diet of Makah tribal members associated with consuming freshly harvested gray whale food products. The following sections contain discussions of these criteria for each alternative.

4.16.3.1 Alternative 1

Under the No-action Alternative, no Makah gray whale hunt would be permitted. Thus, Makah tribal members would not have access to or consume freshly harvested whale food products. Under this alternative, no change in the exposure to contaminants or food-borne pathogens or the nutritional composition of the diet from foods consumed by the Makah Tribe would be expected. The continued absence of freshly harvested gray whale food products in the diet of the Makah would continue to preclude them from realizing the added nutritional benefits (e.g., minerals and omega-3 fatty acids) associated with consuming them, but there are no data to suggest that current diets of individual Makah members sufficiently lack these nutritional benefits. For example, the omega-3 fatty acid benefits of whale products (e.g., prevention of heart disease and glucose intolerance) may be adequately realized by tribal members from other food sources. Overall, there is insufficient information to conclude that the lack of fresh whale products under the No-action Alternative would not be expected to alter dietary conditions for any tribal member.

4.16.3.2 Alternatives 2, 3, 4, 5, and 6

Unlike conditions under the No-action Alternative, Alternatives 2, 3, 4, 5, and 6 would allow the Makah Tribe to conduct gray whale hunts in the project area, and it is assumed that consumption of freshly harvested gray whale food products would occur. Based on Section 4.16.1, Introduction, it is impossible to predict the precise changes in exposure to contaminants or food-borne pathogens or the nutritional composition of the Makah diet if they have the opportunity to consume freshly harvested whale food products. In general, no substantial changes in the type of exposure to contaminants or food-borne pathogens by the Makah would be expected under any of the action alternatives; the level of exposure to these contaminants would, however, be unknown. Consumption of freshly harvested gray whale food products may temporarily increase the overall nutritional value of the Makah diet by raising the proportion of certain minerals and omega-3 fatty acids if diets currently lack this benefit. Omega-3 fatty acids have been shown to positively affect glucose tolerance and insulin sensitivity in Alaska Natives (Ebbesson et al. 2005b; Ebbesson et al. 2005c). This relative nutritional increase would occur only as long as whale products were available for consumption and would be greatest under Alternatives 3 and 6 and lowest under Alternative 5.

4.17 National and International Regulatory Environment

4.17.1 Introduction

This section evaluates the potential for the six alternatives to influence the future decisions of parties other than the Makah to seek or not seek an MMPA waiver to take marine mammals and/or a WCA quota to take whales resulting in increased take of marine mammals. It also evaluates the potential for the alternatives to influence the future positions or actions of other countries in the IWC arena or their actions in managing whale hunting by their nationals. Finally, it evaluates the potential for the alternatives to influence the behavior of other countries towards indigenous people within their borders.

4.17.2 Evaluation Criteria

To examine the potential effects on marine mammals nationally, analyses in this section address the potential for changes in the number of requests for waivers under the MMPA and/or quota allocations under the WCA. Potential effects on whales worldwide are examined through an assessment of the potential for changes in whaling activities. Potential effects on indigenous people worldwide are examined through an assessment of increased or decreased opportunities to pursue ceremonial and subsistence practices. The following sections further discuss these evaluation criteria and the likelihood of changes in the regulatory environment under the six alternatives.

4.17.2.1 Marine Mammals Nationally

NMFS' waiver of the moratorium and issuance of regulations and permits for the Makah to hunt in compliance with the 9th Circuit decision in *Anderson v. Evans* (2004) under Alternatives 2 through 6 has the potential to lead to additional requests for MMPA waivers from non-Indians or Indian tribes, and ultimately to the federally-authorized take of additional marine mammals.

NMFS' actions under Alternatives 2 through 6 could also lead to additional requests for a quota under the WCA by those claiming aboriginal subsistence whaling rights.

4.17.2.1.1 Increased Take of Marine Mammals by Non-Indians

Section 101(a)(3)(A) of the MMPA directs the Secretary to determine whether and by what means it is compatible with the Act to waive the moratorium and allow taking of any marine mammal. In the history of implementation of the MMPA there have been few requests to the Secretary of the Interior or the Secretary of Commerce to waive the MMPA take moratorium. Section 3.17.3.1, Waivers of the MMPA Take Moratorium, details examples of past waiver requests. Given that history and the substantive requirements, the time and process involved, NMFS considers it unlikely that a successful request by the Makah Tribe would influence non-Indian parties in the United States to seek additional waivers. For example, Alaska's request for a waiver for 10 species resulted in a 1976 waiver for walruses. There is no evidence that the success of the walrus request resulted in additional requests from other states seeking management authority. For the same reasons, NMFS considers it unlikely that a decision under the No-action Alternative to deny the Makah's request would decrease the number of future requests by non-Indians for waivers of the MMPA take moratorium. If NMFS' authorization of a hunt under Alternatives 2 through 6 did lead to additional waiver requests, the outcome of any process to consider them would depend on a number of facts that are not presently known, making it speculative to conclude that the harvest of marine mammals nationally would increase as a result of implementing Alternatives 2 though 6.

4.17.2.1.2 Increased Take of Marine Mammals by Indian Tribes

NMFS recognizes that some Northwest Indian tribes traditionally harvested and used products from seals, sea otters and other marine mammals. Northwest Indian tribes have in the past expressed an interest in harvesting marine mammals (Schmitten 1994). Additionally some tribes may continue to believe and assert that their treaty rights to take marine mammals are not subject to the MMPA. A successful completion of the authorization process in response to the Makah in this waiver request may influence these other Indian tribes in the Northwest and nationally to seek waivers of the moratorium to take marine mammals. The outcomes of any future processes would depend on facts not presently known, but it is possible that implementation of Alternatives 2 through 6 could lead to increased federally authorized take by other Indian tribes. With respect to the No-action Alternative, it is uncertain whether a decision by NMFS to deny the Makah Tribe's request would result in less harvest of marine mammals by Indian tribes in the future.

4.17.2.1.3 Increasing Aboriginal Subsistence Whaling and Harvest of Whales

Aside from Indian tribes and Alaska Natives, NMFS is not aware of other entities in the United States that could claim aboriginal status to pursue whaling under the WCA. Alaska Natives have received WCA allocations for bowhead whales since 1978. The Makah Tribe formally expressed interest in resuming a gray whale hunt starting in 1995 (Makah tribal Council 1995a). NMFS first published a WCA quota for their use in 1998 (63 FR 16701, April 6, 1998). The 1998-2002 gray whale catch limit in the Schedule was revised to include Makah's aboriginal subsistence whaling (Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling). Although it has been over 29 years since the Alaska Natives first received a WCA allocation, and over nine years since the Makah received theirs, no other Indian tribe or Alaskan native has requested an allocation or inquired about receiving an allocation for whales under the WCA. This history suggests that beyond the Makah there is little need or interest by other native groups to seek take of gray whales. Accordingly, NMFS considers it unlikely that publishing a WCA gray whale quota for the Makah's use under Alternatives 2 through 6 would influence other Indian tribes to seek WCA quotas, eventually leading to the harvest of other whale species in other aboriginal subsistence whaling operations. In any event, any WCA quota issued would be subject to the IWC catch limit. And before NMFS could publish a WCA quota, it would also be required to present a needs statement to the IWC. The outcome of that process would depend on facts not currently known and the outcome is therefore uncertain.

With respect to No-action Alternative, it is unlikely that a decision by NMFS to deny the Makah Tribe's request would result in fewer requests for WCA allocations from Indian tribes in the future.

4.17.2.2 Worldwide Whaling

In addition its ruling regarding the MMPA, the court in *Anderson v. Evans* (2004) also ruled that NMFS should have prepared an EIS rather than an EA for its past Makah whale hunting proposal, finding that

> the agencies' [sic] failure to consider the precedential impact of our government's support for the Makah Tribe's whaling in future IWC deliberations remains a troubling vacuum. We conclude that the possible impact on the heretofore narrow aboriginal subsistence exception supports our conclusion that an EIS is necessary.

Public comments also expressed concern that NMFS' approval of Makah whale hunting could lead to increased whaling by weakening United States leadership in whale conservation or strengthening the position or resolve of whaling proponents.

The United States' negotiating position before the IWC is not subject to NEPA review (although an opportunity for public review is available, as described in Section 1.2.4.1.4, United States' IWC Interagency Consultation). Once the IWC amends its Schedule, NMFS implements that decision domestically by publishing an aboriginal subsistence whaling quota and entering into a cooperative agreement with the Tribe (Section 1.2.4.2, National Whaling Governance under the WCA). Pursuant to the *Anderson v. Evans* decision, to authorize this gray whale hunt NMFS also must decide whether to waive the take moratorium under the MMPA, and issue necessary regulations and permits (Section 1.2.3, Marine Mammal Protection Act). These decisions by NMFS are subject to NEPA review, which is provided through this EIS. NMFS' decision under the WCA and MMPA in response to this request may have the potential to influence the positions or actions of the United States and others regarding whaling worldwide. This analysis addresses the potential for NMFS' authorization of Makah whale hunting pursuant to this request to increase whaling worldwide by weakening the United States' ability to oppose commercial and scientific whaling in the international arena, by emboldening other countries to pursue whaling, or by expanding the interpretation of what constitutes aboriginal subsistence whaling.

Since the early 1970s the United States has consistently supported the moratorium on commercial whaling and insisted on safeguards before any whaling can resume. The United States has also opposed lethal scientific whaling. To support its position the United States has cited management concerns, rather than a philosophy that all whaling of any kind should be banned. Throughout the period of time the United States has opposed commercial and scientific whaling, it has supported aboriginal subsistence whaling, for example by proposing and defending bowhead catch limits on behalf of Alaska Natives. For these reasons, it is unlikely that NMFS' actions to either deny the Makah request (Alternative 1- No-action) or grant the Makah some level of hunting (Alternatives 2 through 6) would change the United States' position on commercial and scientific whaling or its ability to actively pursue its position.

It is also unlikely that NMFS' actions on the Makah request would effectively be used by other countries to obtain bargaining leverage. Though Japan attempted to use the United States' bowhead request in 2002 as influential evidence in its pursuit of small type coastal whaling, there is no evidence that this move led to a fundamental change in United States position that in turn led to a change in whaling. There is also no evidence that whaling proponents such as Japan would use the United States' authorization of a Makah hunt as a bargaining tool. It is more likely that the outcome of Japan's requests for small-type coastal whaling, or the pro-whaling nations' efforts to remove the moratorium on commercial whaling, depends on the balance of power in the

IWC rather than on bargaining maneuvers like those that took place in 2002 over the bowhead catch limit. The fact that Japan and the other pro-whaling countries supported the ENP gray whale catch limit even as they were opposing the bowhead catch limit in 2002 undercuts the argument that pro-whaling countries would use the Makah hunt to obtain bargaining leverage (3.17.3.2.3 Aboriginal Subsistence Whaling). In 2007, bowhead and gray whale aboriginal subsistence catch limits were revised by consensus at the annual meeting of the IWC (Section 1.4.1.2.1, Relevant Overview of Requests for Bowhead Whales on Behalf of Alaska Eskimos, and Section 1.4.1.2.2, Overview of Requests for ENP Gray Whales on Behalf of the Makah).

There is a potential that NMFS' authorization of a Makah whale hunt under Alternatives 2 through 6 would embolden pro-whaling nations to authorize whaling by their nationals that they might not otherwise have authorized. Pro-whaling nations have argued that all whale-killing should be treated equally, limited only by principles of sound science and management. These nations could argue that the resumption of whale-killing by the Makah justifies an increase in other types of whaling. Moreover, the ability of aboriginal subsistence whalers to sell handicrafts made from inedible parts (which is included in Alternatives 2 through 6) has been used by pro-whaling nations to characterize aboriginal hunts as 'commercial' and to argue that there is no difference between this type of commerce and commerce in meat or blubber. However, this argument has been made even in the absence of a Makah hunt. NMFS considers it unlikely, however, that an authorization of a gray whale harvest by the Makah Tribe under Alternatives 2 through 6 would make an important difference in the probability of pro-whaling nations increasing their commercial or scientific whaling operations. The United States' ongoing support of the Alaska Native aboriginal subsistence hunt, and its support of other such hunts within the IWC, have placed it firmly in the company of nations supporting aboriginal subsistence whaling, even while having a history of opposing a resumption of commercial whaling and high levels of scientific whaling such as that carried out by Japan.

There is also a potential that NMFS' potential authorization of a Makah whale hunt under Alternatives 2 through 6 would be viewed as an expansion of the definition of aboriginal subsistence whaling, leading to increased requests at the IWC for aboriginal subsistence whaling and ultimately an increase in whaling within that category. One distinction between Makah whale hunting and other aboriginal subsistence hunts approved by the IWC is the Tribe's 70- to 80-year hiatus in whaling. There is the possibility that pro-whaling nations would use a perceived expansion of the definition to bolster their requests for whaling operations that have characteristics similar to aboriginal subsistence whaling, but differ in some way. Japan's argument that small-type coastal whaling is similar to aboriginal subsistence whaling is an example of how an IWC party might use Makah whaling to support its desired whaling operations. However, this argument has been made even in the absence of a Makah hunt. While there is evidence that pro-whaling parties within the IWC will use the authorization of any whaling activities, including a Makah hunt for gray whales, to support their efforts to receive approval for their proposed whaling operations, there is no evidence that such a tactic would lead to the commercial moratorium being lifted, or to an increase in whaling worldwide. Language adopted by the IWC when the joint United States-Russian Federation request was first approved referred to "aborigines whose traditional aboriginal subsistence and cultural needs have been recognized," suggesting the possibility that each IWC party was free to recognize the subsistence and cultural needs of its aborigines (IWC 1998).

NMFS examined the history of whaling within the IWC to aid its analysis of the potential for United States approval of the Makah request to lead to future increases in whaling. Figures 4-1 through 4-3 depict whale harvests since 1985, in total and by species, in commercial, scientific, and aboriginal subsistence whale hunts. Generally, the figures show a steep decline in commercial harvest following Japan's withdrawal of its objection to commercial harvest (after the 1987/1988 season), a steady increase in scientific whaling following Japan's withdrawal of its objection, and a drop in aboriginal subsistence harvest of minke and gray whales through the early 1990s, followed by an increase. NMFS calculated the trend for each type of whaling for the period before and after the first request that the United States made on behalf of the Makah at the IWC meeting in 1996 (1985-1996, and 1997-2005, respectively) to test whether there is a correlation between United States' actions on behalf of the Makah and whaling worldwide. As shown in Figures 4-1 through 4-3, for each type of whaling there is a significant difference in the trend before and after 1996.

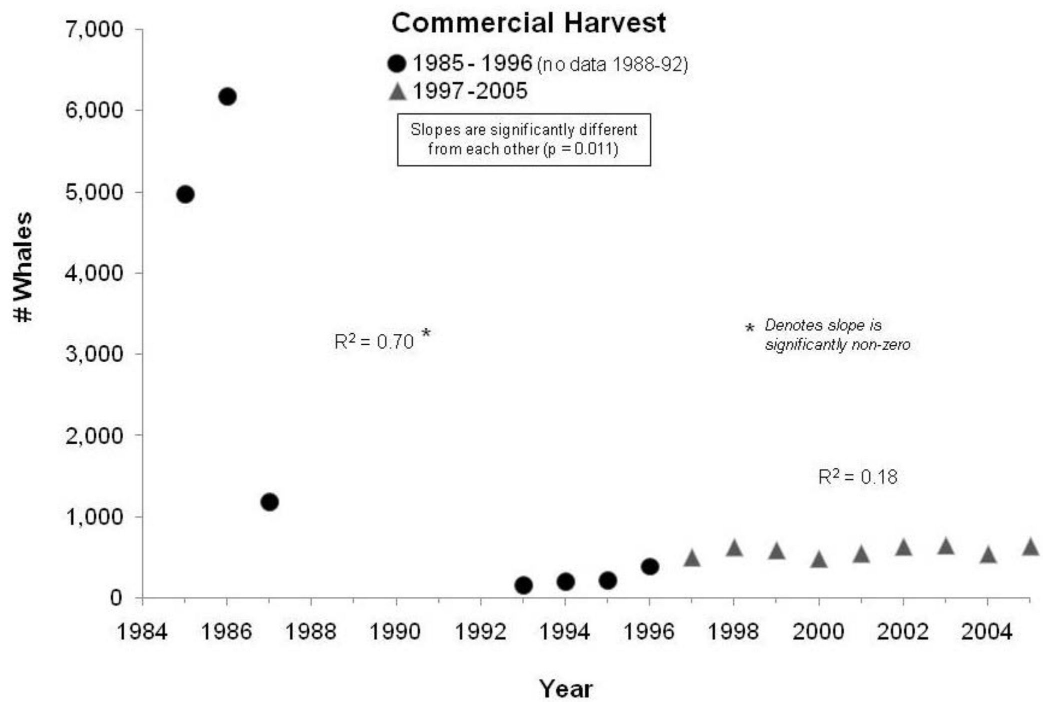

Figure 4-1. Trend Analysis for Commercial Harvest before and after 1996

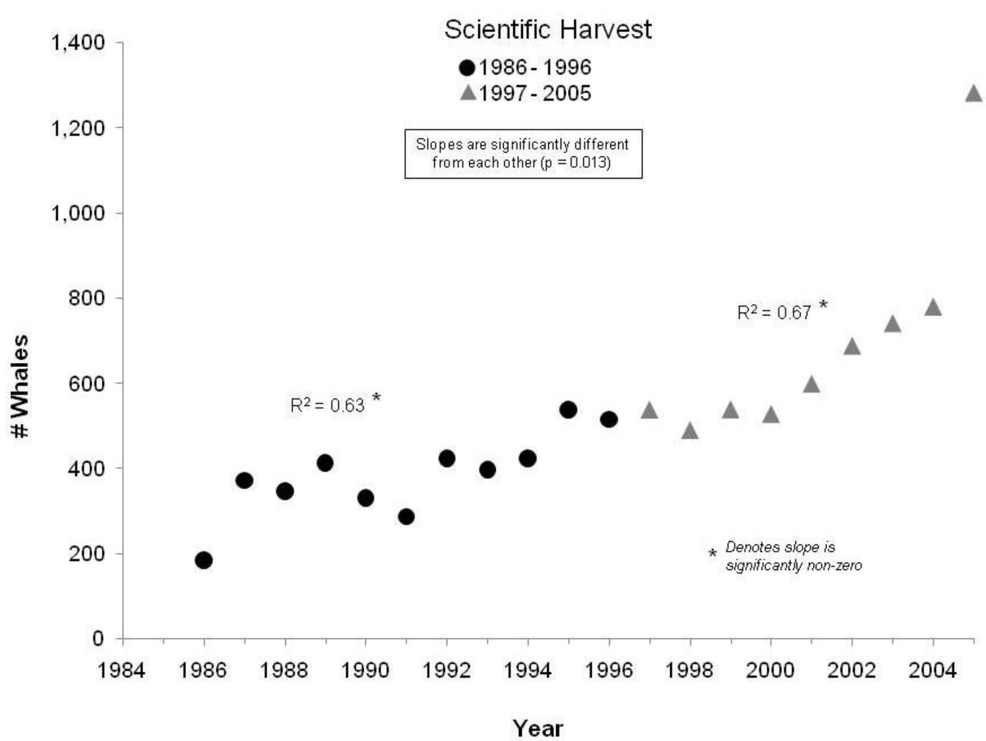

Figure 4-2. Trend Analysis for Scientific Whaling before and after 1996

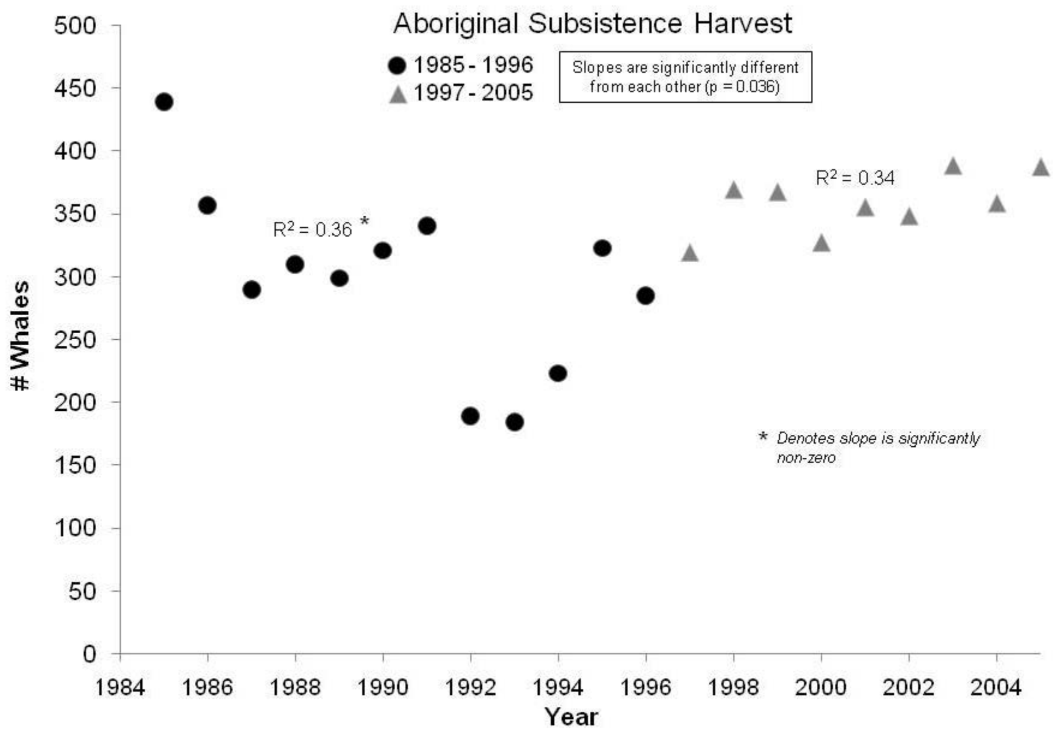

Figure 4-3. Trend Analysis for Aboriginal Subsistence Whaling before and after 1996

While a simple representation of these trends suggests there may be a correlation between the Makah request and increased whaling activity for every type of whaling, other information suggests this is not the best interpretation of the data. For each type of whaling, there was an increasing trend that began well before 1996. For scientific whaling, that increasing trend began in 1985; for commercial whaling it began in 1993; and for aboriginal subsistence whaling it began in 1992. As Tables 3-47 through 3-49 illustrate, the increases in commercial and scientific whaling reflect increased harvest of minke whales, while the increase in aboriginal subsistence whaling reflects increased harvest of minke and gray whales. The increased harvest of minke whales in Norway's whaling, which began before 1996, likely reflects the view by Norway that harvest should be allowed of abundant stocks that can sustain harvest. The increased harvest of minke whales in Japan's scientific whaling, which also began before 1996, reflects a change in its research program. This increase has occurred even in the absence of NMFS' authorization of a Makah hunt.

NMFS' decision to authorize or deny the Makah request may have a minor effect on some of the dynamics of the international debate regarding whaling. It is too speculative to conclude, however, that those effects would lead to an increase in whaling worldwide, given the constantly shifting dynamics within the IWC, the legislative nature of IWC decision-making, and the numerous factors any country must consider when it authorizes hunting.

4.17.2.3 Indigenous People Worldwide

NMFS' denial of the Makah request under Alternative 1 (No-action Alternative) may have the potential to diminish the ability of indigenous people worldwide to pursue ceremonial and subsistence practices, by setting an example that would encourage other countries to prohibit or interfere with such practices. Conversely, if NMFS authorizes the Makah to hunt gray whales under Alternatives 2 through 6 it may encourage other governments to allow indigenous people worldwide to pursue ceremonial and subsistence practices, thereby increasing the ability of indigenous people to engage in such practices.

The United States considers its role regarding such rights to be one of leading by example, guaranteeing civil freedoms to all its citizens through legally prescribed processes. If NMFS provides a full consideration of the Makah request, with due process, and makes a decision that complies with the *Anderson v. Evans* court decision and other relevant law, that would be consistent with the United States' position in the international arena that indigenous people should be governed by domestic laws, and that those laws should include processes for protecting civil freedoms. Moreover, it is not clear that other countries would necessarily consider or look to the ultimate outcome of the United States' process in deciding whether to prohibit related or unrelated indigenous practices.

4.17.3 Evaluation of Alternatives

The following sections consider the potential for the alternatives, to influence the future positions or actions of other countries in the IWC arena or their actions in managing whale hunting by their nationals and to influence the behavior of other countries towards indigenous people within their borders.

Under Alternatives 2 through 6, NMFS would authorize the Makah whale hunting by waiving the take moratorium, promulgating regulations, and issuing permits under the MMPA, and publishing aboriginal subsistence whaling quotas for the Makah Tribe's use and entering into a cooperative agreement under the WCA. Under the No-action Alternative, NMFS would not authorize any whale hunt under either the MMPA or the WCA.

4.17.3.1 Alternative 1

Under the No-action Alternative, NMFS would not authorize a gray whale hunt by the Makah Tribe. It is unlikely this action would change the United States' negotiating position in the IWC regarding commercial, scientific or aboriginal subsistence whaling, or the ability of the United States to influence debates in the IWC. It is also unlikely this action would change the ability of indigenous people worldwide to pursue ceremonial and subsistence practices, so long as NMFS' process and decision are consistent with the *Anderson v. Evans* court decision and other applicable law and demonstrate the integrity of the process. The relationships between indigenous people and their governments are affected by numerous factual considerations. It is unlikely that NMFS' denial of the Makah Tribe's request to harvest up to five whales annually would influence the complicated decisions made by other governments regarding ceremonial and subsistence practices of indigenous people.

4.17.3.2 Alternatives 2 through 6

It is uncertain whether NMFS' action to authorize a gray whale hunt would increase whaling worldwide by emboldening pro-whaling countries. While such an outcome is possible, it is speculative given the variety of issues and dynamics that drive the decisions of the IWC or of countries party to the IWC.

Similar to the No-action Alternative, it is unlikely this action would change the ability of indigenous people worldwide to pursue ceremonial and subsistence practices, so long as NMFS' process and decision are consistent with the *Anderson v. Evans* court decision and other applicable law and demonstrate the integrity of the process. The relationships between indigenous people and their governments are affected by numerous factual considerations. It is unlikely that NMFS' authorization of a Makah gray whale hunt would influence the complicated decisions made by other governments regarding ceremonial and subsistence practices of indigenous people.

Chapter 5
Cumulative Effects

5.0 CUMULATIVE EFFECTS

5.1 Context for Analysis

The National Environmental Policy Act (NEPA) defines cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Section 3.0, Affected Environment, described the current status of each resource, which reflects the effects of past and current actions. Section 4.0, Environmental Consequences, evaluated the effects of the Makah Tribe’s proposed hunt and the alternative actions on the current status of each resource. This section now considers the cumulative effects of each alternative on each resource, in the context of the effects of past actions, current conditions, and reasonably foreseeable future actions and conditions.

The Olympic coast is sparsely populated, with almost the entire coastline being undeveloped (Section 3.1.1.1, Olympic Coast National Marine Sanctuary). Most of the project area lies within the Olympic Coast National Marine Sanctuary, and most of the coast is either wilderness (part of the Olympic National Park) or tribal land (Figure 1-1). The only projected development in the area of which NMFS is aware is the Makah Bay Wave Energy Pilot Project (Section 3.4.3.6.10, Marine Energy Projects). The project has been licensed to operate for five years (FERC 2007a), and will involve four buoys deployed about 3.7 miles from shore in the Makah U&A. Each buoy will be tethered by a cable to four surface floats (approximately 4 feet in diameter) and each float will be connected by a cable to a subsurface anchor buoy just above the seafloor. All cables in the anchoring system will be under tension. A transmission cable will connect the buoys to a transmission station on land. This cable will lie along the ocean floor until it reaches a depth that is 10 to 30 feet below mean lower low tide, at which point it will be placed underground until it reaches the station. At this time the applicant has no definitive plans for future expansion of the project (AquaEnergy 2006). It is conceivable that expansion will be proposed in the future. In that event, the applicant “would initiate a new round of acquiring necessary permits or amendments and would engage in additional environmental review” (AquaEnergy 2006). Prior to issuing the license for the project, FERC issued an Environmental Assessment (EA), which examined its potential environmental consequences (FERC 2007b). The following discussion draws on this document.

The other future activity with the potential to affect some of the resources project area is the projected growth of shipping into Puget Sound, which will increase the number of container ships traversing the Strait of Juan de Fuca. Approximately 4,500 vessels annually traversed the Strait of Juan de Fuca during 2002 through 2004 (Table 3-40). The Washington Ports Association projects a 4 percent annual growth rate of container shipping into Puget Sound through 2025. Container ships in the Strait are controlled by the Coast Guard's vessel separation scheme (3.6.3.1.4, Commercial Shipping). Alternative 6 would allow the Makah Tribe to hunt in the entire Makah U&A, including the Strait of Juan de Fuca, year-round. Vessel activity associated with hunting would therefore be added to a volume of vessel traffic that is projected to increase in the future.

In addition to future actions in the project area, future actions along the entire coast have the potential to affect gray whales because of their migration patterns. Projections for the future of shipping coastwide are uncertain due to concerns about fuel prices and the capacity of west coast ports to accommodate increased volumes (White 2008). There are several proposals by various entities to develop ocean energy projects all along the Pacific coast (Section 3.4.3.6.10, Marine Energy Projects). At this time these projects are in the preliminary stages of study and design, and it is difficult to predict how many will ultimately be deployed and in what configuration. Consequently, an analysis of the impact of the action alternatives on gray whales or other wildlife, when added to the effects of future ocean energy projects, would be speculative, or not possible without project details available to analyze.

5.2 Water Quality

As described in Section 3.2.3, Water Quality, Existing Conditions, Ecology has not listed any of the waters in the project area as impaired (in other words, no past or current actions are negatively affecting the quality of waters in the project area to the point that they are impaired). None of the alternatives would have more than a negligible impact on water quality. The EA for the Makah Bay wave energy project concluded that it would have only localized and short-term impacts on water resources (FERC 2007b). Increased vessel traffic could increase the risk of oil spills in the Strait. It is likely, however, that the amount of oil from a potential spill associated with a gray whale hunt would be small because of the size of vessels involved, and would quickly disperse (Section 4.2.3.2-4.2.3.6, Water Quality, Alternatives 2-6). Compared to the volume of oil associated with an oil spill from a cargo vessel, the volume of oil potentially spilled during a Makah gray whale hunt in the Strait of Juan de Fuca under Alternative 6 would represent a minor contribution to the overall risk in the Strait. For these reasons, no cumulative effects are anticipated on water quality.

5.3 Marine Habitat and Species

As described in Section 3.1.1.1.2, Designation and Regulatory Overview, the marine and coastal environment of the northern Washington coast is a highly productive and nearly pristine. As described in Section 3.3.3, Marine Habitat and Species, Existing Conditions, the marine habitat and species in the project area are shaped by large-scale physical processes that would not be affected by any hunting or associated activities under any of the alternatives. In addition, hunting activities under any of the alternatives would have only minor short-term localized impacts on the marine habitat or species in the project area. The EA for the Makah Bay wave energy project examined potential impacts on fish, invertebrates, and marine vegetation in the project area. It concluded that no fish or invertebrates were likely to be entrapped in the buoys; installation of the project would result in a temporary localized disturbance of fish and invertebrates; the small footprint of the mooring buoys and the placement of the transmission cable on silt and sand (rather than rocky areas) would result in little or no disturbance of fish species, invertebrates, and marine vegetation; and the underground placement of the transmission cable in the nearshore area would limit disturbance of the nearshore benthic environment (FERC 2007b).

The FERC EA includes a variety of protective measures to reduce any potential impacts to marine habitats and species, including: developing a fuel and oil spill control, prevention, and countermeasures plan; developing and implementing a plan to conduct a baseline and post-installation hard substrate benthic community survey along the proposed submarine transmission line route; removing existing marine debris and derelict fishing gear from the immediate project area prior to project construction and installation. The minimal effect on marine habitat and species from any of the alternatives examined in this analysis, combined with minimal effects from the Makah Bay wave energy project, are unlikely to have cumulative effects on marine habitat and species.

5.4 Eastern North Pacific Gray Whale

Section 3.4.3, Eastern North Pacific Gray Whale, Existing Conditions, describes the life history and current status of ENP gray whales. The ENP stock of gray whales is recognized by the International Whaling Commission (IWC) and NMFS as a single stock without subpopulations or management units. It also describes the dynamic use of the southern portion of the whales' summer range by individual whales, some of which return to areas within this southern portion in multiple years. Section 4.4, Environmental Consequences, Eastern North Pacific Gray Whales, considers the potential impacts of the six alternatives on the ENP gray whale stock as a whole, gray whales in local survey areas, and individual gray whales.

For the ENP gray whale stock as a whole, past over-harvesting led to its depletion and listing in the United States as an endangered species. With the moratorium on commercial harvest, the stock recovered to the point where it was de-listed. NMFS considers the stock to currently be at or near its carrying capacity and so within its OSP. NMFS estimates the ENP gray whale stock can sustain the harvest of 417 whales per year and still remain within its optimum sustainable population (OSP) level. All six alternatives are likely to have the same effect on the ENP gray whale stock as a whole, which is a removal of an average of 124 whales per year (zero to five whales killed by Makah hunters with the remainder harvested in the Chukotkan hunt). This level of mortality would be added to other sources of mortality that include whales that are killed by ship strike, whales that are killed incidental to fishing operations, and whales that are struck and lost and may die as a result of their injuries.

Angliss and Outlaw (2008) estimate that about seven whales die annually in United States commercial fisheries, and one dies annually from ship strike. Data regarding gray whale mortalities in Canadian fisheries are not readily available. However, they are thought to be small and the large stock size and rate of increase over the past 20 years makes it unlikely that unreported mortalities from those fisheries would be a significant source of mortality for this stock (Angliss and Outlaw 2008). The number of whales struck and lost in the Chukotka hunt has varied annually, with nine reported in 2005 as the highest recent reported number. Assuming all struck and lost whales die, the number of whales potentially lost from all sources of human-caused mortality would be approximately 141. That number is only one-third of the calculated PBR for the ENP gray whale stock. The cumulative effects of human-caused mortality would not affect the ability of the ENP gray whale stock as a whole to be maintained at its OSP level.

In the future, the ENP gray whale stock as a whole, and particularly gray whales in the Strait of Juan de Fuca portion of the Makah Tribe’s U&A, may be affected by the projected increases in shipping through the Strait. Given the small number of gray whales estimated to be killed by ship strike throughout their entire range, as described above, it is unlikely there would be more than a minor increase in the risk of ship strike in the Strait in the future. Therefore, under Alternative 6 (which allows hunting in the Strait), only minor cumulative impacts to gray whales in the Strait of Juan de Fuca would be expected as a result of increased shipping.

Another future development with the potential to affect the ENP gray whale stock as a whole, and particularly gray whales in the Makah U&A, is the proposed wave energy projects described in Section 3.4.3.6.10, Marine Energy Projects. These projects have the potential to result in serious injury or death of migrating or summer-feeding whales. Before any of these projects are licensed, they must undergo a permitting process that would consider their effects on ENP gray whales (as was done with the permit issued for the pilot project in Makah Bay).

As analyzed in FERC's EA (FERC 2007b), the Makah Bay wave energy project would pose only minor or localized risks to gray whales. Identified potential risks to marine mammals include noise effects, disturbance from or collisions with construction and maintenance vessels, electromagnetic fields effects on marine behavior and migration, collision with mooring and anchor lines/cables, and entanglement with the buoy mooring system and transmission cable. The likelihood of a ship strike with marine mammals is considered low because of the small amount of vessel traffic and slow speeds that would occur during construction, (FERC 2007b). Because of the small area occupied by the project relative to vastness of the open ocean, the potential for marine mammals to encounter the buoy array is also considered small. Similarly, entanglement is also deemed unlikely because cable tension should avoid forming loops, and cable spacing is wide enough apart for animals to pass through. Disturbance from noise (primarily vessel traffic during construction) is expected to be minimal and short term, and will likely be dampened by the effect of surf and substrate. In addition, the FERC EA (FERC 2007b) includes a variety of protective measures to reduce potential impacts to marine mammals, including: using observers during cable laying activities, biannual anchor inspections, keeping a standby vessel to assist entangled animals, and monitoring for entanglement, collisions, and cetacean acoustics. Therefore, no cumulative effects to gray whales are anticipated as a result of the Makah Bay wave energy project, when combined with effects under any of the alternatives considered here.

Several additional ocean energy projects are proposed along the gray whales' migration route (Section 3.4.3.6.10, Marine Energy Projects), which if developed could affect migrating gray whales. At this time it is unknown whether or how such projects might be deployed. Thus, although ocean energy projects arrayed along the west coast could negatively affect the abundance of the gray whale population as a whole, there is insufficient information at this time to evaluate potential cumulative effects. The Scientific Committee of the IWC annually monitors the status of ENP gray whales. In the event that gray whale abundance declines as a result of the development of ocean energy projects (or any other future developments), the IWC has a process in place to adjust catch limits every five years for aboriginal subsistence hunting (Section 1.2.4.1.3, IWC Aboriginal Subsistence Whaling).

Ocean energy projects could have a greater impact on summer-feeding whales in the PCFA survey areas than on the ENP gray whale stock as a whole because the summer-feeding whales spend more time along the west coast. If ocean energy projects negatively affect the abundance of gray whales identified in the ORSVI survey area, under Alternative 2 the number of identified whales that can be harvested would be reduced accordingly. Under Alternatives 3, 5, and 6, which do not include provisions for adjusting the numbers of identified whales that can be harvested, it is possible that the abundance of identified whales in the ORSVI would decline as a result of cumulative effects.

Evidence of global climate change in the past few decades has accumulated from a variety of geophysical, biological, oceanographic, and atmospheric sources. The scientific evidence indicates that average air, land, and sea temperatures are increasing at an accelerating rate. Although climate changes have been documented over large areas of the world, the changes are not uniform and affect different areas in different ways and intensities. Arctic regions have experienced some of the largest changes, with major implications for the marine environment as well as for coastal communities (Gitay et al. 2002 for the Intergovernmental Panel on Climate Change [IPCC]; Arctic Climate Impact Assessment 2004; IPCC 2007).

Global climate change may also affect abundance, viability and distribution of the ENP gray whale stock in the future. ENP gray whales feed on a variety of prey, both benthic and pelagic, and will switch feeding areas and strategies in response to changes in prey availability (Section 3.4.3.3, Distribution and Habitat Use). Global climate change may cause diminished prey availability in the northern portion of the summer range, causing more whales to use the southern portion of the summer range (Weiss 2007). At this time it is uncertain how overall gray whale abundance and viability will be affected by global climate change (Weiss 2007). As described above, the Scientific Committee of the IWC annually monitors the status of the ENP gray whale stock, and the IWC has a process to adjust catch limits.

For gray whales in local survey areas, there are no other cumulative effects that are unique from those that affect the gray whale stock as a whole. Although the whales' migratory corridor is also a major shipping route, there is no evidence that disturbance from shipping has prevented the whales' use of local survey areas both during the migration periods and the summer feeding period. The estimated number of whale mortalities per year from ship strikes is low (one to two), with an unknown number of those mortalities being whales identified in local survey areas. There is no evidence that this level of mortality is affecting the ENP gray whales' use of the local survey areas. There is some whale-watching that occurs in the local survey areas, but no evidence that this activity results in more than a minor temporary disturbance. Adding the potential disturbance and mortalities associated with a gray whale hunt under Alternatives 2 through 6 to these existing levels of disturbance and mortality would not be expected to have effects on gray whales in local survey areas and individual gray whales beyond those already analyzed in Section 4.4.3, Eastern North Pacific Gray Whale, Evaluation of Alternatives.

For individual whales, it is possible that the stress associated with hunting, when added to existing sources of stress such as those described in Section 3.4.3.6, Known and Potential Anthropogenic Impacts, could lead to the mortality of some individual whales. This possibility is explored in Section 4.4.2.1, Change in Abundance and Viability of the ENP Gray Whale Stock.

5.5 Other Wildlife Species

Section 4.5.3, Other Wildlife Species, Evaluation of Alternatives, analyzes the effects likely to occur to other wildlife species from implementation of Alternatives 2 through 6. These effects would primarily be from vessel noise and disturbance and would be greater under alternatives that involve the greatest number of days of hunting (Alternatives 3 and 6). Some disturbance would also be expected from aircraft and gunfire associated with a hunt. Under all alternatives these effects are expected to be minor and temporary for all species with the possible exception of some seabird colonies during the nesting season. Section 3.13.3, Transportation, Existing Conditions, describes existing levels of vessel and air traffic in the project area to which the additional vessel and air traffic would be added under Alternatives 2 through 6.

Future increases in shipping through the Strait of Juan de Fuca have the potential to affect marine mammals and birds through vessel interactions and noise. Vessel collisions with marine mammals, though rare, could increase in the Strait as a result of increased shipping. Added to this increased risk would be the slight increased risk of vessel strike associated with a gray whale hunt in the Strait under Alternative 6. Increased vessel traffic in the Strait could also affect birds using the Strait for nesting, foraging and other activities. Under Alternative 6, minor cumulative impacts on marine mammals and birds are possible as a result of increased shipping.

The EA for the Makah Bay wave energy project describes potential impacts to other wildlife species (FERC 2007b). For marine mammals (including pinnipeds and otters) it concluded there would be minimal impacts, for the reasons described above under Section 5.4, ENP Gray Whales. For sea birds it concluded that any disturbance would be short term and localized and primarily associated with the construction phase of the project (FERC 2007b). Seabird entanglement in the completed mooring and anchor system is deemed unlikely because of adequate cable burial, tension, and spacing (FERC 2007b). Available information does not suggest that existing levels of disturbance for any species are currently a cause of concern for any species of wildlife in the project area. The minor, short-term localized disturbance from any of the alternatives, combined with the minimal disturbance from the Makah Bay wave energy project, when added to existing levels of disturbance, would not result in cumulative effects to other wildlife species.

5.6 Economics

Section 3.6.3, Economics, Existing Conditions, describes Clallam County's recent drop in unemployment rate (from 6.9 percent in 2000 to 5.6 percent in 2006) and increase in personal income (63 percent increase from 1990 to 2004). Levels of unemployment are higher and personal income lower in Neah Bay compared to county-wide data. There are no foreseeable future trends that may affect the present economic climate in the county or in Neah Bay.

Section 4.6, Environmental Consequences, Economics, analyzes the potential for minor temporary increases or decreases in tourism in Clallam County and Neah Bay if a gray whale hunt is authorized under Alternatives 2 through 6. It also describes no likely change in economic conditions if a gray whale hunt is not authorized under Alternative 1. According to the EA for the Makah Bay wave energy project (FERC 2007b), that project would have a positive effect on the economy in the project area. Given the current economic climate and generally favorable economic trends in Clallam County, and that the potential effects of any of the alternatives are either nonexistent or minor and temporary, no cumulative effects are anticipated on the local economy.

5.7 Environmental Justice

Section 4.7, Environmental Justice, describes the potential effects on the Makah Tribe (the population of concern for purposes of considering Executive Order 12898, *Environmental Justice*) of the No-action Alternative and the five action alternatives. Because the Makah Tribe has requested authorization of a whale hunt, impacts to the Tribe under the action alternatives are not an issue of concern under the Executive Order. Under the No-action Alternative, it is possible the Makah Tribe would experience cumulative effects, for the reasons described under 5.10, Subsistence and Ceremonial Resources.

5.8 Social Environment

As described in Section 3.8, Social Environment, Existing Conditions, various groups and individuals have different opinions about hunting whales. NMFS received public comments about the hunt from a broad geographic area; public scoping occurred in the vicinity of the project area as well as in Washington D.C. Makah Tribe members and other tribes generally support the hunt, while the general public has mixed feelings about the issue. Section 4.8, Environmental Consequences, Social Environment, analyzes the potential for these different groups to experience both increased social conflict and increased social bonding, within the groups and outside the groups, under any of the alternatives. Other social issues exist that may have caused conflict or bonding within or among these groups in the past, and new issues are likely to arise in the future. It is too speculative to consider whether the issue of Makah gray whale hunting would result in substantial cumulative effects within this larger social context.

5.9 Cultural Resources

As analyzed in Section 4.9, Environmental Consequences, Cultural Resources, no adverse effects are expected to cultural resources if hunting is authorized under Alternatives 2 through 6. Some beneficial effects are possible to both listed and unlisted cultural sites historically used for whaling-related ceremonies if hunting is authorized. These sites are also used for other non-whaling activities. No cumulative effects are expected beyond those considered in Section 4.9 since no effects would occur to sites outside of the project area.

5.10 Subsistence and Ceremonial Resources

Section 3.10.3, Ceremonial and Subsistence Resources, Existing Conditions, describes the past and current status of Makah subsistence and ceremonial practices, including a history of such practices being discouraged by United States government policy and a recent resurgence in such practices. It also describes the prestige accorded whaling families in traditional Makah society. Section 4.9, Environmental Consequences, Cultural Resources, examines the potential for resumption of whaling under Alternatives 2 through 6 to enhance the Tribe's subsistence and ceremonial practices and, conversely, for implementation of Alternative 1 (no authorized hunting) to detract from these practices. Future policies of the United States Government are difficult to predict, as are future trends in the values of the dominant culture that may affect Makah ceremonial and subsistence practices. It is also not possible to predict the availability of subsistence resources in the future, although it is likely that resources will shift as global climate change affects the ocean ecosystem. It is possible that a denial of the Tribe's request under

Alternative 1, when added to the legacy of United States Government policies discouraging subsistence and ceremonial practices, would have negative cumulative effects.

5.11 Aesthetics

Under Alternatives 2 through 6 there may be some temporary aesthetic effects to those viewing gray whale hunts through the media or from local vantage points both inside and outside of the project area. There are currently no issues identified in the project area related to aesthetics, and those outside of the project area were addressed as a direct or indirect affect from media coverage or vantage points. No cumulative effects would therefore be expected beyond the effects of alternatives analyzed in Section 4.12.3, Aesthetics, Evaluation of Alternatives.

5.12 Transportation

Under Alternatives 2 through 6 there may be some localized, temporary effects on highway traffic in the project area, but no transportation effects would occur outside of the project area. Marine and air traffic effects outside of the project area were also analyzed in Chapter 4. The Makah Bay wave energy project is not likely to have effects on transportation in the project area (FERC 2007b). If the project were expanded in the future, there could be effects, which would be analyzed under NEPA. No cumulative effects would therefore be expected beyond the effects of the alternatives analyzed in Section 4.13.3, Transportation, Evaluation of Alternatives.

5.13 Public Services and Public Safety

Under Alternatives 2 through 6 there may be some localized, temporary effects on police services in the project area, but no strains are anticipated on medical services in either the project area or on medical services in larger cities outside of the project area. It is not anticipated that localized needs for police services under any of the action alternatives would require additional services from law enforcement sources outside of the project area analyzed in Chapter 4. No cumulative effects would therefore be expected beyond the effects of the alternatives analyzed in Section 4.14.3, Public Services, Evaluation of Alternatives, or Section 4.15.3, Public Safety, Evaluation of Alternatives.

5.14 Public Safety

This resource area is considered above.

5.15 Human Health

Section 3.16.3, Human Health, Existing Conditions, describes the levels of contamination found in gray whales and the potential for food-borne pathogens associated with the butchering, storage and preparation of gray whale products. It also describes the nutritional benefits of gray whale food products. As discussed in Section 4.16.3, Human Health, Evaluation of Alternatives, the contaminant level in the current diet of Makah Tribe members is unknown, and it is not possible to evaluate the change in Tribal members' exposure to contaminants or pathogens, or in their nutrition, without knowing how much or what type of whale products individuals would consume and without knowing the contaminant level and nutritional composition of their present diet.

Furthermore, it is not possible to determine how past events such as a moratorium on whaling affected the overall health of the Makah Tribe since no data exist to demonstrate changes in health before and after whale hunting was allowed. Additionally, there would be no cumulative effect resulting from consumption of whale products beyond that analyzed for the Makah tribal members in Chapter 4 since no other communities would be exposed to whale products under any alternative.

5.16 National and International Regulatory Environment

As described in Section 4.17.3, National and International Regulatory Environment, Evaluation of Alternatives, it is too speculative to conclude that NMFS' decision to authorize or not authorize a whale hunt would affect marine mammals in the United States, whaling worldwide, or indigenous people worldwide. It is therefore too speculative to conclude that there would be any cumulative effects on these resources associated with a NMFS decision under any of the alternatives.

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During DEIS development, NMFS also consulted with the following agencies and organizations: Cascadia Research Collective; Clallam County Sheriff's Department; Makah Tribe; NMFS National Marine Mammal Laboratory; NMFS Office of Law Enforcement; NOAA National Marine Sanctuary Program; Northwest Indian Fisheries Commission; U.S. Coast Guard; U.S. Department of the Interior; U.S. Fish and Wildlife Service; and Washington State Police.

Distribution List

Public Scoping Distribution List

Federal Agencies

Council on Environmental Quality
Federal Emergency Management Agency Region X
Fisheries and Oceans Canada
Marine Mammal Commission
National Parks Service Library
NOAA Habitat Conservation Division
NOAA National Marine Fisheries Service
NOAA National Marine Mammal Laboratory
NOAA National Marine Sanctuary Program
NOAA Olympic Coast National Marine Sanctuary
Olympic National Forest
Olympic National Park
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Department of the Interior, Bureau of Indian Affairs
U.S. Department of the Interior, Office of Environmental Policy and Compliance
U.S. Environmental Protection Agency (EPA) Region X
U.S. Fish and Wildlife Service
U.S. Representative, State of Washington, 1st, 2nd, 3rd, 6th, 7th, 8th, and 9th Districts
U.S. Senator, State of Washington, Seats 1 & 2

State Agencies & Elected Officials

Office of the Governor, State of Washington
Office of the Lieutenant Governor, State of Washington
Washington State Attorney General's Office
Washington State Department of Ecology
Washington State Department of Fish and Wildlife
Washington State Department of Health
Washington State Department of Natural Resources
Washington State House of Representatives Standing Committees-
Economic Development, Agriculture, and Trade Committee
Natural Resources, Ecology, and Parks Committee
Rules Committee
Washington State House of Representatives, 1st, 2nd, 5th, 10th, 11th, 19th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, and 48th Districts
Speaker, Washington State House of Representatives
Majority Leader, Washington State House of Representatives
Minority Leader, Washington State House of Representatives
Washington State Senate, Standing Committees - International Trade & Economic Development Committee, Natural Resources, Ocean, Recreation Committee, Rules Committee, Water, Energy & Environment Committee, and Ways & Means Committee
Majority Leader, Washington State Senate
Minority Leader, Washington State Senate
Washington State Senator, 1st, 2nd, 5th, 10th, 11th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, and 48th Districts

County & Local Agencies

Clallam Conservation District
Clallam County Commissioners
Clallam County Economic Development Council
Grays Harbor County Commissioners
Island County Commissioners
Jefferson County Commissioners
King County, Department of Natural Resources and Parks
Kitsap County Commissioners
Mason County Commissioners

Pacific County Commissioners
Pierce County Council
Pierce County Planning Department
Port Angeles Chamber of Commerce
San Juan County Commissioners
San Juan County Planning Department
Skagit County Commissioners
Snohomish County Commissioners
Thurston County Commissioners
Washington State Association of Counties
Whatcom County Council

Native American Tribes & Organizations

Affiliated Tribes of Northwest Indians
Chehalis Tribe
Chinook Indian Tribe
Coeur D'Alene Tribe
Columbia River Intertribal Fish Commission
Colville Confederated Tribes
Confederated Tribes and Bands of the Yakama Nation
Confederated Tribes of Grand Ronde
Confederated Tribes of Warm Springs
Cowlitz Indian Tribe
Hoh Indian Tribe
Indigenous Environmental Network
International Indian Treaty Council
Jamestown S'Klallam Tribe
Kalispell Tribe
Lower Elwha Klallam Tribe
Lummi DNR
Lummi Indian Business Council
Makah Fisheries Management
Makah Indian Tribe
Muckleshoot Tribe
Muckleshoot Tribe Fisheries Department
National Congress of American Indians
National Indian Gaming Association
Native Movement
Nez Perce Tribe
Nisqually Indian Tribe
Nooksack Indian Tribe
Northwest Indian College
Northwest Indian Fisheries Commission
Point-No-Point Treaty Council
Port Gamble S'Klallam Tribe
Puyallup Tribe
Puyallup Tribe Fisheries Department
Quileute Indian Tribe
Quileute Natural Resources
Quinault Indian Nation
Samish Indian Nation
Sauk-Suiattle Tribe
Shoalwater Bay Tribe
Skagit System Cooperative
Skokomish DNR
Snoqualmie Tribe
Spokane Tribe
Squaxin Island Tribe
Stillaguamish Indian Tribe
Suquamish Tribe
Suquamish Tribe Fisheries Department
Swinomish Tribe
Tulalip Tribes
Umatilla Confederated Tribes
United Indians of All Tribes Foundation
Upper Columbia United Tribes
Upper Skagit Indian Tribe
Washington State Indian Education Association
Yakama Indian Nation
Yakama Nation TFW

Organizations

Advocate of Animals
Advocates for Animals
American Cetacean Society
American Lands
Animal Legal Defense Fund
Animal Protection Institute
Animal Voices
Australians for Animals
Breach Marine Protection
Cascadia Research Collective
CASH (Committee to Abolish Sport Hunting Inc)
Cetacea Defense
Cetacean Society International
Civitas (Citizens for Planetary Health)
Coastal Waters Project
Concerned Citizens of Planet Earth

Defenders of Wildlife National Headquarters
Earth Island Institute International Marine Mammal Project
Humane Education Network
Humane Society of Canada
Humane Society of the United States
International Community of Concerned Citizens on Animal Welfare
League of Animal Protection Voters
League of Women Voters
National Wildlife Federation
Nature Conservancy of Washington
Ocean Advocates
Ocean Defense International
Olympic Peninsula Audubon Society
ORCA
Pacific States Marine Fisheries Commission
Sea Sanctuary
Sea Shepherd Conservation Society, Inc
Seattle Audubon Society
Sierra Club - Cascade Chapter
Sierra Club - National Headquarters
The Fund for Animals
The Humane Society of the United States
The Mountaineers
The Peaceful Kingdom Alliance 4 Animals, Inc
The Pegasus Foundation
The Peninsula Citizens for the Protection of Whales
The Whaleman Foundation
The Wildlife Society
Washington Association of Conservation Districts
Washington Citizens' Coastal Alliance
Washington Environmental Council
Washington Forest Law Center
Washington State Natural Resources Committee
Western Environmental Law Center Northwest Office
Wildlife Advocacy Project
Williamsburg & Greenpoint Dog Owners Group
World Whale Police

Businesses

Hirschkop & Associates
Meyer & Glitzenstein
MORI-ko L.L.C.
Parametrix
San Juan Safaris
Schubert & Associates
Sea Wolf Adventures
Whale Watch Operators Association Northwest
Ziontz, Chestnut, Varnell, Berley & Slonim

Media

Forks Forum
KING Television (Seattle)
KIRO Television (Seattle)
KOMO Television and Radio (Seattle)
KONP Radio (Port Angeles)
Native American Times
Peninsula Daily News - West End
Seattle Post-Intelligencer
Seattle Times
Tacoma News Tribune
The Chronicle
The Northern Light
The Olympian
TVW Washington State Public Affairs Network

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North Olympic Library System Clallam Bay Branch Library
North Olympic Library System Forks Branch Library
North Olympic Library System Sequim Branch Library
Olympia Timberland Library
Orcas Island Public Library
Pierce County Library System
San Juan Library
Seattle Public Library, Government Publications Department
Sno-Isle Regional Library
Tacoma Public Library
Whatcom County Library

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*Other public scoping comments were received via electronic mail; however, no mailing addresses were provided for DEIS distribution.

Appendix A

- **Makah Tribe's 2/11/2005 Request for a Waiver of the Marine Mammal Protection Act (MMPA) Take Moratorium**

- **Makah Tribe's 1/24/2006 Clarification of MMPA Waiver Request Application**

- **Management Plan for Makah Treaty Gray Whale Hunting for the Years 1998-2002 as Amended April 2001**

MAKAH TRIBE

P.O. BOX 115 • NEAH BAY, WA 98357 • 360-645-2201

February 11, 2005

William T. Hogarth, Ph.D.
Assistant Administrator
National Oceanic and
Atmospheric Administration
Room 14636
1315 East-West Hwy
Silver Spring, MD 20910

Re: Makah Tribe's Request for a Waiver of the Marine Mammal Protection Act (MMPA) Take Moratorium

Dear Dr. Hogarth,

Under the 1855 Treaty of Neah Bay, the Makah Tribe secured an express right to hunt whales throughout its usual and accustomed grounds and stations. The Makah Tribe's express whaling rights have not been abrogated by any subsequent statute including the Marine Mammal Protection Act (MMPA). Nevertheless, the Ninth Circuit Court of Appeals has held that, notwithstanding the Makah Tribe's express whaling rights under the Treaty of Neah Bay, the National Oceanic and Atmospheric Administration (NOAA) must waive the MMPA take moratorium before the Tribe may exercise its Treaty whaling rights. *Anderson v. Evans*, 371 F.3d 475 (9^{th} Cir. 2004).

Consider this letter and the attached application the Tribe's formal request for a waiver of the take moratorium under Section 101(a)(3) of the MMPA, 16 U.S.C. § 1371(a)(3), to allow a ceremonial and subsistence (C&S) harvest from the Eastern North Pacific stock of gray whales (*Eschrichtius robustus*) within the Makah Tribe's adjudicated usual and accustomed grounds. *See United States v. Washington*, 626 F.Supp. 1405, 1467 (W.D.Wash. 1985). The total take of gray whales for which the Tribe seeks a waiver is up to 20 gray whales in any five-year period subject to a maximum of five gray whales in any calendar year.

In accordance with Section 101(a)(3) of the MMPA, the Tribe asks you to determine that it is compatible with the Act to waive the moratorium to allow for the taking of whales requested in this letter and attached application, and to adopt suitable regulations and make determinations in accordance with Sections 102, 103, and 104 of the Act. We also ask you to simultaneously undertake a National Environmental Policy Act review of the Tribe's request.

The Tribe believes that approval of this request is consistent with the purposes and policies set forth in Section 2 of the MMPA and is necessary for the United States to fulfill its fiduciary obligations to the Tribe under the Treaty of Neah Bay. As shown in the attached application, the Tribe's requested harvest of gray whales will ensure that gray whales remain a significant functioning element in the ecosystem and will not permit the Eastern North Pacific gray whale stock to fall below its optimum sustainable population.

The Tribe thanks you in advance for your attention to this important matter.

Sincerely,

MAKAH TRIBAL COUNCIL

Ben Johnson Jr.

Ben Johnson, Jr.
Chairman

CC: Rolland Schmitten, U.S. IWC Commissioner
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APPLICATION FOR A WAIVER OF THE MARINE MAMMAL PROTECTION ACT TAKE MORATORIUM TO EXERCISE GRAY WHALE HUNTING RIGHTS SECURED IN THE TREATY OF NEAH BAY

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Executive Summary

This document constitutes the application of the Makah Indian Tribe (the "Tribe") under Section 101(a)(3) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. § 1371(a)(3), for a waiver of the moratorium on the taking of marine mammals which would allow the Tribe to conduct a Treaty ceremonial and subsistence (C&S) harvest of up to 20 gray whales from the Eastern North Pacific (ENP) stock in any five-year period, with a maximum of five whales per year. The proposed waiver would be subject to permanent regulations adopted by the Secretary of Commerce under Section 103 of the MMPA, 16 U.S.C. § 1373, which would authorize the National Oceanic and Atmospheric Administration (NOAA) to issue the Tribe a renewable whaling permit of up to five years in duration under Section 104 of the MMPA, 16 U.S.C. § 1374, provided that the Tribe enacts, implements, and enforces Tribal regulations which meet minimum standards necessary to conserve the ENP stock, avoid local depletion, and ensure a safe and humane hunt. These standards will include:

- Limits on the total number of gray whales that may be struck in a calendar year;
- Time and area restrictions designed to avoid any intentional harvest of gray whales comprising the Pacific Coast Feeding Aggregation (PCFA);
- Monitoring and adaptive management measures designed to ensure that any incidental harvest of gray whales from the PCFA remains below an annual allowable bycatch level (ABL) that will be conservatively established by applying the MMPA's potential biological removal (PBR) methodology to a conservative abundance estimate which is based on the number of gray whales that exhibit inter-annual site fidelity to the Oregon to Southern Vancouver Island (ORSVI) survey area;
- Measures that will ensure that the hunt is as humane as practicable consistent with the continued use of traditional hunting methods; and
- Measures to protect public safety.

The Makah Tribe has at least a 1,500-year-old whaling tradition and secured an express right to take whales under Article IV of the 1855 Treaty of Neah Bay. The Tribe's Treaty whaling rights have not been abrogated by the MMPA or any other federal statute. Under well-established case law, these rights are subject to restriction only where necessary to prevent demonstrable harm to a particular stock or species of whales.

Nevertheless, in *Anderson v. Evans*, 371 F.3d 475 (9th Cir. 2004), the Ninth Circuit Court of Appeals decided that the Tribe must obtain a waiver of the MMPA's take moratorium before it may exercise its Treaty whaling rights. The Tribe strongly disagrees with the Court's holding, but is filing this application to provide a legal framework that will allow for long-term exercise of its Treaty whaling rights consistent with the conservation needs of the gray whale. Approval of this waiver request is needed to meet the Tribe's cultural and subsistence needs and to fulfill the

United States government's Treaty and trust obligations to the Tribe.

The population of Eastern North Pacific stock of gray whales is at its historic levels and within its optimum sustainable population (OSP). After accounting for the Makah whale hunt, the total human-caused mortality, which includes aboriginal subsistence harvest by native groups in Russia, will be just over a third of the stock's PBR level of 366 whales. The Scientific Committee of the IWC provided management advice in 2002 that a take of up to 463 whales per year is sustainable for at least the medium term (~30 years). This level of harvest is over 350 percent higher than the average annual joint US-Russian quota of 124 whales per year. Because there is no likelihood that the Makah whale hunt will cause the Eastern North Pacific stock to fall below OSP in the foreseeable future, the Tribe's waiver request is well within the Tribe's rights under the Treaty of Neah Bay and is consistent with the policies and requirements of the MMPA.

For the purposes of this application, the Pacific Coast Feeding Aggregation (PCFA) is defined as any whale found in NOAA's photo-identification database which has been observed south of Alaska from June 1 through November 30 in any year. The PCFA is not a discrete stock of whales for the purposes of the MMPA. Nevertheless, the Tribe has agreed to safeguards that will prevent any intentional harvest of gray whales that exhibit inter-annual site fidelity to the Pacific coast south of Alaska. The Tribe will allow whale hunting only during established gray whale migration periods (December 1 through May 31) and prohibit hunting in gray whale feeding grounds in the Strait of Juan de Fuca.

To minimize the risk of incidental harvest of whales from the PCFA and ensure that gray whales remain a functioning element of the ecosystem, the Tribe in consultation with NOAA will compare photographs of all landed whales with NOAA's photo-identification database for the PCFA. The Tribe will suspend the hunt in a calendar year if necessary to prevent the harvest of whales found in the PCFA database from exceeding an annual allowable bycatch level (ABL). The ABL will be calculated by applying the MMPA's PBR methodology to a conservative abundance estimate based on the number of gray whales that are seen in more than one year in the Oregon-Southern Vancouver Island (ORSVI) survey area between June 1 and November 30.

NOAA should approve the Tribe's request for a waiver and adopt regulations that permit the Tribe to exercise its treaty rights in the manner specified in this application. The proposed waiver is necessary for the United States government to fulfill its legal obligations to the Tribe under the Treaty of Neah Bay, will not disadvantage the ENP stock of gray whales, and will be consistent with the purposes and policies of the MMPA.

Definitions.

Allowable Bycatch Level (ABL): the number of whales from the PCFA that may be taken incidental to a hunt directed at the migratory portion of the ENP stock of gray whales. The ABL is calculated using the MMPA's PBR approach but the minimum population estimate is calculated from the number of previously seen whales in the Oregon-Southern Vancouver Island (ORSVI) survey area.

Harassment: any act of pursuit, torment, or annoyance which— (i) has the potential to injure a marine mammal or marine mammal stock in the wild (referred to as Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavorial patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (referred to as Level B harassment). 16 U.S.C. § 1362(18).

Humane Killing: that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved. 16 U.S.C. § 1362(4).

Optimum Sustainable Population (OSP): is defined as "with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element." 16 U.S.C. § 1362(9). NOAA has quantified OSP as a population size which ranges between a stock's maximum net productivity level (MNPL) and its carrying capacity (K). *See* 50 C.F.R. § 216.3.

Oregon-Southern Vancouver Island (ORSVI) survey area: the gray whale survey region from Oregon to Southern Vancouver Island for which abundance estimates of returning whales are used to develop the allowable bycatch level (ABL). This area was identified in Calambokidis et al. (2004) as the appropriate range to evaluate abundance estimates for the purposes of management of a Makah whale harvest and is based on gray whale interchange rates to survey areas adjacent to the Makah U&A.

Pacific Coast Feeding Aggregation (PCFA): any ENP gray whale found in the photo-identification database maintained by NOAA's National Marine Mammal Laboratory (NMML) which has been observed south of Alaska from June 1 through November 30 in any year.

Potential Biological Removal (PBR): the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population 16 U.S.C. § 1362(20). A total level of human-caused mortality that is less than the PBR is considered sustainable and consistent with the MMPA's goal of managing marine mammal stocks to achieve their OSP level. Under 16 U.S.C. § 1362(2), the PBR for a particular marine mammals stock is calculated by taking the product of the following factors: the minimum population of the stock (N_{min}); one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size (R_{max}); and a recovery factor (F_r) between 0.1 and 1.0.

Strike: means any blow or blows delivered to a whale by a harpoon, rifle or other weapon which may result in death to a whale. A harpoon blow counts as a strike if the harpoon is embedded in the whale. Any rifle shot which hits a whale counts as a strike. For the purpose of this request, multiple strikes on a single whale count as a single strike.

Take: as applied to the number of whales that may be harvested, “take” is defined in accordance with the regulations of the International Whaling Commission, “to flag, buoy or make fast to a whale catcher.” For all other purposes, “take” is defined according to the definition in the MMPA, which means to harass, hunt, capture, or kill, or attempt to harass, hunt capture, or kill any marine mammal. 16 U.S.C. § 1362(13).

Acronyms.

ABL	Allowable Bycatch Level
C&S	Ceremonial and Subsistence
CV	Coefficient of Variation
ENP	Eastern North Pacific
F_r	Recovery factor
ICRW	International Convention on the Regulation of Whaling
IWC	International Whaling Commission
K	Carrying capacity
km	Kilometers
m	Meters
MMPA	Marine Mammal Protection Act
MNPL	Maximum Net Productivity Level
MRT	Minimum Residency Tenure
MSY	Maximum Sustained Yield
MSYL	Maximum Sustained Yield Level
n	Sample size
N	Population estimate
N_{min}	Minimum population estimate
NEPA	National Environmental Policy Act
NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration

ORSVI	Oregon-Southern Vancouver Island
OSP	Optimum Sustainable Population
PBR	Potential Biological Removal
PCFA	Pacific Coast Feeding Aggregation
R_{max}	Maximum theoretical or estimated net productivity rate of a stock at small population size
SARs	Stock Assessment Reports
U&A	Makah Usual and Accustomed grounds and stations
WCA	Whaling Convention Act

I. Request for Waiver and Proposed Regulations.

This document constitutes the application of the Makah Indian Tribe (the "Tribe") under Section 101(a)(3) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. § 1371(a)(3), for a waiver of the moratorium on the taking of marine mammals which would allow the Tribe to conduct a Treaty ceremonial and subsistence (C&S) harvest of up to 20 gray whales from the Eastern North Pacific (ENP) stock in any five-year period, with a maximum of five whales per year. The proposed waiver would be subject to permanent regulations adopted by the Secretary of Commerce under Section 103 of the MMPA, 16 U.S.C. § 1373, which would authorize the National Oceanic and Atmospheric Administration (NOAA) to issue the Tribe a renewable whaling permit of up to five years in duration under Section 104 of the MMPA, 16 U.S.C. § 1374, provided that the Tribe enacts, implements, and enforces Tribal regulations which meet minimum standards necessary to conserve the ENP stock, to avoid local depletion, and to ensure a safe and humane hunt. The term of the initial permit should coincide with the current aboriginal subsistence quota for gray whales approved by the International Whaling Commission (IWC), which runs though 2007. Future permits would be issued in synchrony with IWC aboriginal quotas, which are currently set at five-year intervals.

As discussed in greater detail in Parts II and III of this application, the Makah Tribe has at least a 1,500-year-old whaling tradition and secured an express right to take whales under Article IV of the 1855 Treaty of Neah Bay. The Tribe's Treaty whaling rights have not been abrogated by the MMPA or any other federal statute. Under well-established case law, these rights are subject to restriction only where necessary to prevent demonstrable harm to a particular stock or species of whales.

Nevertheless, in *Anderson v. Evans*, 371 F.3d 475 (9th Cir. 2004), the Ninth Circuit Court of Appeals decided that the Tribe must obtain a waiver of the MMPA's take moratorium before it may exercise its Treaty whaling rights. The Tribe strongly disagrees with the Court's holding but is filing this application to provide a legal framework that will allow for long-term exercise of its treaty whaling rights consistent with the conservation needs of the gray whale. Approval of this waiver request is needed to meet the Tribe's cultural and subsistence needs and to fulfill the United States government's Treaty and trust obligations to the Tribe.

The Tribe proposes to manage the whale hunt under Tribal regulations which meet the following minimum standards:

A. Number of Gray Whales that May Be Taken.

The Tribe's regulations will limit the number of gray whales that may be "taken," as that term is defined in IWC regulations, to no more than five in any calendar year, and to no more than 20 in any five-year period.[1] In addition, Tribal regulations will limit the number of gray whales that may be "struck," a more inclusive term that encompasses all whales that are "taken," to no

[1] Under the IWC Schedule, the term "take" means to flag, buoy or make fast to a whale catcher.

more than seven in any calendar year.[2] The Tribe's regulations will limit the number of struck and lost whales to no more than three in any calendar year. The number of gray whale takes and strikes allowed by Tribal regulation will be subject to reduction if necessary to meet the international treaty obligations of the United States under the International Convention for the Regulation of Whaling (ICRW) or to prevent the abundance of the ENP stock from falling below its optimum sustainable population level (OSP). Tribal regulations will not allow the taking of any other species of whales except gray whales.

B. Age, Size, and Sex of Gray Whales that May Be Taken.

Tribal regulations will prohibit the striking of a whale calf, or any whale accompanied by a calf.

C. Season When Gray Whales May Be Taken.

The Tribe's regulations will prohibit the striking of a gray whale between June 1 and November 30 of any calendar year. The purpose of this restriction is to prevent the intentional harvest of whales that may be part of the Pacific Coast Feeding Aggregation (PCFA).

D. Manner and Location in which Gray Whales May Be Taken.

The Tribe's regulations will prohibit the striking of a gray whale outside of the Tribe's usual and accustomed (U&A) grounds as adjudicated in *United States v. Washington*, 626 F.Supp. 1405, 1467 (W.D. Wash. 1985). The Tribal regulations will also prohibit the striking of a gray whale within the Strait of Juan de Fuca. Hunting will only occur in the waters of the Pacific Ocean bounded by the following line: a line beginning at the northwestern tip of Cape Flattery running to the Tatoosh Island Lighthouse; from the Tatoosh Island Lighthouse to the buoy adjacent to Duntze Rock; from the buoy adjacent to Duntze Rock following a straight line to Bonilla Point on Vancouver Island but stopping at the Exclusive Economic Zone (EEZ); tracking the EEZ boundary westward to 125° 44'00" longitude; south along 125° 44'00" longitude to 48° 02'15" latitude; east along 48° 02'15" latitude to shore; and then track the shoreline northward to point of origin at Cape Flattery.

To further reduce the risk of local depletion, Tribal regulations will provide for detailed photographic monitoring of all landed whales. As soon as practicable after a successful hunt, in consultation with scientists from NOAA's National Marine Mammal Laboratory (NMML) the Tribe will compare photographs of landed whales with the NMML photo-identification catalog for the Pacific Coast Feeding Aggregation (PCFA), which includes any gray whale that has been photographed south of Alaska between June 1 and November 30 in any year. The Tribe will cease hunting in a calendar year when photographic analysis indicates that suspension of the hunt

[2] For the purposes of this request, the term "strike" means any blow or blows delivered to a whale by a harpoon, rifle or other weapon which may result in death to a whale. A harpoon blow counts as a strike if the harpoon is embedded in the whale. Any rifle shot which hits a whale counts as a strike. (Makah Tribal Council 2001).

is necessary to prevent the number of harvested whales from the PCFA catalog from exceeding an annual allowable bycatch level (ABL) for that year. The ABL will be calculated by applying the MMPA's PBR methodology to a conservative abundance estimate based on the number of gray whales that exhibit site fidelity (i.e., seen in more than one year) in the Oregon to Southern Vancouver Island (ORSVI) survey area between June 1 and November 30.

The Tribe's regulations will also include measures that will ensure that the hunt is conducted in the most humane manner practicable consistent with the Tribe's goal of providing opportunities for a traditional ceremonial and subsistence hunt. To this end, all whales will be harpooned with a toggle-point harpoon with floats attached before being dispatched with a .50 caliber rifle shot to the central nervous system (brain and upper spinal cord). During the 1999 hunt these methods resulted in a time to death of approximately 8 minutes. The Tribe anticipates that the time to death will improve as its hunters gain additional experience.

To address concerns about impacts to nesting seabirds, no whale may be struck within 200 yards of Tatoosh Island or White Rock during the month of May. The Tribal regulations will also include measures to ensure that the hunt is conducted in a manner which is at least as protective of public safety as the measures provided for in the Tribe's 2001 Gray Whale Management Plan (Makah Tribal Council 2001).[3] Further management measures to address public safety and possible impacts to other species may be developed based on the outcome of NOAA's National Environmental Policy Act (NEPA) review of the Tribe's request.

E. Other requirements.

The Tribe's regulations will restrict the use of whale products to local consumption and ceremonial purposes in accordance with section 102(f) of the MMPA. 16 U.S.C. § 1372(f). No whale products will be sold or offered for sale, except that traditional handicrafts (including artwork) made from non-edible whale products may be sold or offered for sale within the United States. The Tribe requests a limited waiver from the MMPA's prohibition on the sale of marine mammal products for the purposes of selling such traditional handcrafts. The requested waiver would be similar to, but more restrictive than, the exemption for Alaska native handicrafts provided in Section 101(b)(2) of the MMPA, 16 U.S.C. § 1371(b)(2).

The Tribe's regulations will include a permit system which provides that no Tribal member may engage in whaling except under the control of a whaling captain who is in possession of a valid whaling permit issued by the Makah Tribal Council. Whaling permits issued by the Council must incorporate and require compliance with all of the requirements of the Tribe's regulations.

Tribal regulations will provide for a training and certification process for all members who

[3] These measures authorized the discharge of firearms when whaling only when the shooter was within 30 feet of the target area of the whale and the shooter's field of view was clear of all persons, vessels and other objects that could result in injury or loss of human life. The measures also set minimum visibility standards for the hunt. (Makah Tribal Council 2001).

participate in whaling.

Tribal regulations will offer accommodations for a NOAA Fisheries observer during all hunts, including providing the designated observer from NOAA Fisheries with at least 24 hours notice of the issuance of any whaling permit unless the observer is already present on the Makah Reservation. The regulations will also allow NOAA Fisheries to collect specimen material from landed whales, including ovaries, ear plugs, baleen plates, stomach contents, and other tissue samples.

Tribal regulations will include provisions for Tribal monitoring of all hunts and annual reporting of all monitoring data to NOAA Fisheries. At a minimum, Tribal monitoring will include maintaining accurate records of the time, date, and location of all strikes; the body length, fluke width, and sex of all landed whales and any fetus found in a landed whale; and the time to death for all whales killed. As indicated previously, all landed whales will be photographed to allow comparison with the NMML photographic database compiled for the PCFA.

Tribal regulations will include provisions requiring Tribal enforcement of the regulations. The enforcement regulations shall include criminal sanctions, including fines and imprisonment, up to the limits imposed by the Indian Civil Rights Act.

II. Purpose of and Need for the Waiver Request.

The purpose of the Tribe's application for a waiver of the take moratorium is to obtain authorization under the MMPA for a Treaty C&S harvest of up to 20 gray whales in any five-year period from the Eastern North Pacific (ENP) stock, with a maximum of five gray whales per year. As decided by the Ninth Circuit Court of Appeals in *Anderson v. Evans*, 371 F.3d 475 (9th Cir. 2004), a waiver of the MMPA's take moratorium is necessary for the Tribe to exercise its express whaling rights under Article IV of the Treaty of Neah Bay. Approval of this request is needed to satisfy the United States government's obligations to the Tribe under the 1855 Treaty of Neah Bay and the federal trust responsibility, and to fulfill the Tribe's cultural and subsistence needs which are discussed below and in the attached need statement submitted to the IWC in 2002 (Appendix A; Renker 2002).

A. The Tribe's Cultural and Subsistence Needs.

As discussed in further detail in Appendix A, the Tribe has at least a 1,500-year whaling tradition. Whaling was central to the Tribe's way of life, providing a primary means of subsistence as well as essential social and cultural functions.[4] Whaling was so important to the Tribe that it expressly reserved whaling rights in the 1855 Treaty of Neah Bay. Although Makah whaling declined in the decades after the Treaty due to forces beyond the Tribe's control, the Makah people have never forgot their whaling traditions. Over the past two decades, the Tribe has begun to restore its language, songs and dances and many other cultural traditions. The resumption of whaling in the late 1990s has brought the Tribe significant cultural and social benefits as well as a badly needed subsistence resource. Approval of this waiver application, which seeks a harvest of up to five gray whales per year from the ENP stock, would enable the Tribe to continue its cultural renaissance and provide significant nutritional resources to an economically deprived community.

1. The Makah Tribe's Whaling Tradition.

The relationship between the Makah people and whaling is of great antiquity. The Ozette archeological site on the northern Washington coast contains evidence of some 1,500 years of continuous whaling. Archeological and ethnohistorical data demonstrate that the Makah hunted gray whales as well as other whale species. The number of whales taken by Makah whalers varied from year to year. Based on historic documents, it is estimated that Makah whalers averaged about 5.5 whales per year between 1889 through 1892, a time when the gray whale population had already been substantially reduced by non-Indian commercial whaling. Whaling for gray whales occurred during both the fall and spring migrations, with some hunts occurring 30 or more miles from shore.

The Makah hunted whales from giant canoes, approximately 36 feet long and more than 5

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[4] The discussion in this section is taken from Renker (2002). Readers are directed to Appendix A for a list of references for this section.

feet wide, which were carved from a single cedar log. Other equipment included mussel-shell harpoons, sealskin floats, fathoms of line made from whale sinew and cedar, and a variety of knives. Whaling equipment and methods were constantly evolving. After contact with Euro-Americans, Makah whalers began to use metal harpoon heads at the ends of their traditional wood harpoons and accepted tows from steamers to and from the whaling grounds.

A whaling crew consisted of a chief, or “whaler,” and seven men. The whaler owned the canoe and the whaling equipment and acted as the sole harpooner. Other crew members included a steersman, a man responsible for managing the lines and buoys, numerous paddlers, and a man who had the unique responsibility of diving into the water and fastening the whale’s mouth shut after the whale was killed.

The whale was initially harpooned behind the front flipper. Once the first harpoon had been driven into the whale and the first set of floats attached, the whale was pursued and killed with a long wooden lance. The process of killing a whale could take up to three to four days. Once killed, the whaling crew had to tow the animal back to land, a process which could take another two days. Whales were butchered according to strict protocols, which identified the sequence of the butchering, the portions of the whale reserved for ceremonial use, and the portions to be distributed to the crew and other village inhabitants.

Positions on whaling crews were restricted to men who could withstand the rigors of intensive ritualized training, possessed the hereditary access to the position and its ritualized knowledge, or underwent a supernatural encounter which engendered the gift of whaling ability. All crew members undertook rigorous ceremonial and spiritual preparations prior to the hunt; the success of the hunt depended as much on the observance of rituals as the strength and skill of the whalers. The families of the whalers were also expected to observe rituals to ensure the safety and success of the hunters.

Whaling was the keystone of traditional Makah society. Makah society was mirrored in the structure of the whale hunt, including ceremonial preparation, the hunt itself, and the ultimate acts of butchering and distribution. Whalers, or headmen, were ranked at the top of the social pyramid. Whaling success translated into physical wealth and social prestige for the headman. Women married to whalers likewise dominated the top of the female status pyramid. Ceremonies to prepare whalers and their families for the hunt provided the Makah with a social framework that contributed to governmental, social, and spiritual stability.

In addition to its cultural and social benefits, whaling provided the Makah with an essential subsistence resource. Archeological studies show that as much as 85 percent of the Makah pre-contact diet could have been composed of whale meat, oil and other food products. Whale blubber and oil also provided an important source of trade goods. Whale products insured that the Makah enjoyed a high standard of living and a diversified economy.

2. The Treaty of Neah Bay.

In the early 19th century, as non-Indian traders and explorers entered the waters of the

Northwest, the Makah experienced increasing demand for whale products. The Makah expanded their trade in whale oil and other whale products in response to this demand, selling whale oil to the Hudson's Bay Company and other trading outfits.

In early 1855, the Makah were approached by the United States government, through Washington Territorial Governor Isaac Stevens, for the purpose of negotiating a treaty of land cession. From the government's perspective, the purpose of the treaty was to gain title to the region's rich lands and resources in order to make way for non-Indian settlement. While the Makah were willing to sell most of their lands to the United States, the Tribe insisted on retaining its rights to harvest the bountiful marine resources upon which it depended for its existence. To gain Makah acceptance of the treaty, Governor Stevens repeatedly insisted that the government did not intend to stop the Makah from whaling, sealing and fishing, but in fact would help them to develop these pursuits.

Much of the official record of the treaty negotiations reflects this dialogue. At the outset of the discussions, Governor Stevens proposed to buy Makah lands and establish a small reservation at the site of present-day Neah Bay. The first Makah chief to speak, Klachote, responded that the treaty must also protect his "right to fish, and take whales and get food when he liked." The next chief, Keh-tchook, seconded this demand. Governor Stevens acceded to the Makahs' demand, replying that "so far from wishing to stop their fisheries, he wished to send them oil kettles, and fishing apparatus." Governor Stevens reassured the Makah:

> I saw the Great Father a short time since and [he] sent me here to see you and give you his mind. The Whites are crowding in upon you and the Great Father wishes to give you your homes. He wants to buy your land and give you a fair price but leaving you enough to live on and raise your potatoes. He knows what whalers you are, how you go far to sea, to take whales. He will send you barrels in which to put your oil, kettles to try it out, lines and implements to fish with — . . . [T]his will be done if we sign it [the treaty]. If it is good I shall send it to the Great Father, and if he likes it he will send it back with his name. When it is agreed to it is a bargain.

Based on the government's assurances that their whaling rights would be protected, the Makah's agreed to sign the 1855 Treaty of Neah Bay, 12 Stat. 939 (Jan. 31, 1855) (Appendix B). The Treaty was ratified, without alterations, on March 8, 1859. From the Makah perspective, the critical clause of the treaty was Article IV, which provides:

> The right of taking fish *and of whaling* or sealing at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the United States. . . [emphasis added].

Governor Stevens' promise of government assistance with their whaling, sealing and fishing industries was also a significant inducement to the Makah because it allowed for further expansion of the Tribe's existing whaling and fishing enterprises. Significantly, of all of the many Stevens Treaties -- and of all treaties between the United States and Indian tribes -- the Treaty of

Neah Bay is the only one which expressly secures tribal whaling rights.

3. The Decline of Makah Whaling.

Despite Governor Stevens' promises, the United States failed to provide support for Makah fishing, whaling and sealing. Government assistance emphasized agricultural implements rather than items that could have supported the active components of the Makah's maritime economy. Instead of whaling and fishing tools, the Makah received pitchforks, scythes, hoes and sickles. Since the Makah Reservation was unsuited to cultivation, the Makah converted the tines of the pitchforks into fish hooks, the scythes into blubber knifes, and the sickles into arrowheads.

Federal Indian policy in the late 19th century was devoted to changing the Makah and other Indians from self-sufficient hunter-gatherers into farmers, dependent on the government for tools and instruction. Indian policy was also designed to assimilate Indian people through an education system that prohibited use of Indian languages or the exercise of cultural rituals. Despite the Treaty of Neah Bay's recognition of whaling as an important facet of Makah life, the United States government chose not to support the Tribe's well-developed practice.

Indoctrination in government-run boarding schools also worked against traditional subsistence whaling, as did epidemics and government bans on ceremonial activities. Potlatches and secret societies were prohibited, disrupting the Makah system of proprietary rights over dances, songs, and other ceremonies. At the same time that government policy was aimed at converting the Makah to agriculturalists, Pacific whale populations were declining as a result of increased commercial whaling by non-Indians. In 1854, Captain Charles Scammon discovered the Mexican breeding grounds of the gray whale. Gray whale cows and calves were slaughtered in the breeding lagoons bringing about the decimation of the Eastern North Pacific gray whale stock over the next few decades.

During this time, whale hunting remained the symbolic heart of Makah culture but continued to diminish in frequency as it became cost-prohibitive. As whale populations declined, the Makah shifted their resources to pursue more lucrative seal hunting. By the 1890s, Makah schooners were hunting fur seals along the Washington coast and as far north as the Bering Sea.

In short, boarding-school indoctrination and government acculturation policies, combined with a series of devastating epidemics, drastically changed the delicate and complex social dynamic which had supported the traditional Makah whale hunt. These factors, especially when juxtaposed with the severe decline in whale populations, served to discourage the Makah from making the substantial investments needed to pursue traditional whaling.

4. The Tribe's Present Cultural and Subsistence Need for Whaling.

Despite the decline of whaling, the Makah Tribe's interest in retaining their whaling rights and traditions never dissipated. Families passed on whaling stories, traditions, and secrets. The Makah never stopped educating their children about their family whaling traditions. Public schools on the reservation have included whaling in their curricula since the 1960s, with continuous efforts since 1981. Whaling designs and crests still decorate public buildings and private homes. The whaling displays in the Makah Tribe's museum have kept the tradition of whaling alive.

For the past three decades, the Makah have been engaged in a concerted effort to revive their cultural traditions. The Tribe believes that revival of these traditions is needed to combat the social disruption resulting from the rapid changes of the past century and a half. Teenage pregnancies, high school dropouts, substance abuse problems, and an increasing juvenile crime rate indicate that the Makah community is still in flux and that the enormous social disruption caused by epidemics, boarding schools, and federal acculturation policy is still not over. Entire social, cultural, subsistence, and ceremonial institutions were repressed, eradicated, or decimated; without substitution of structural equivalents.

To reverse these disturbing trends, the Makah have reinstituted numerous song, dance and artistic traditions and operated a program to restore the Makah language to spoken proficiency on the reservation. The Makah Cultural and Research Center has been instrumental in the revival of many cultural traditions. Given the centrality of whaling to the Tribe's culture, a revival of subsistence whaling is necessary for the Makah to complete this spiritual renaissance and repair the damage done to the Tribe's social structure during the years of forced assimilation. A recent survey showed that this view is supported by a majority of Makah households.[5]

Continuation and expansion of subsistence whaling will also help address the socioeconomic deprivation experienced by many tribal members. The seasonal unemployment rate on the Makah Reservation is 51 percent, with almost 49 percent of Makah households living in poverty and 59 percent living in substandard housing. According to the 2000 census, median household income on the reservation is approximately $24,000 compared with $46,000 for Washington state as a whole.

Both historically and today, the Makah have addressed economic deprivation by relying on the sea for subsistence. Currently, 85 percent of Makah households have someone in their household who fishes and 63 percent of these households list fishing as the major occupation in their home. Even households without a fisherman derive food, money, or other goods from a fisherman who is a relative or a friend. Fish is a medium of exchange on the reservation and all Makah households participate in reciprocal networks that involve fish at some level of exchange.

A majority of Makah households use traditional Makah foods at least once a week. These include such unique traditional foods as fermented salmon eggs, smoked fish heads and backbones, halibut cheeks and gills, and dried fish. According to a recent analysis, the Makah's annual per capita consumption of fish is 126 pounds, some eight times higher than for the average American. While seafood comprises 55 percent of the Makah diet, it represents only 7 percent of the diet of the average American.

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[5] According to the 2000 census, there are 1356 Makahs living in 471 households on the Reservation. Another 1,117 Makahs live off the Reservation.

Information regarding the Tribe's successful whale hunt in 1999 illustrates the potential for wide-ranging cultural and subsistence benefits from whaling. Thirty-nine percent of households indicated that they participated in whaling-related ceremonial activities, 30 percent of households have cooked whale meat, and 81 percent of Tribal members reported having eaten whale products. An overwhelming number of community members were present when the first whale was landed at Neah Bay in 1999 and 80 percent attended the Tribal celebration of the first whale hunt. Most Makah surveyed felt that the restoration of whaling had improved social and cultural conditions on the Reservation. These data demonstrate that the Makah are fully capable of restoring subsistence whaling to a central place in their culture, economy, and way of life.

B. The Tribe's Recent Efforts to Exercise Its Whaling Rights.

Gray whales were first given international protection from commercial whaling in 1937. By 1993, NOAA determined that the Eastern North Pacific (ENP) stock of gray whales had recovered to near its estimated original population size. 58 Fed. Reg. 3121 (Jan. 7, 1993). NOAA removed the ENP stock from its list of endangered and threatened species on June 16, 1994. 59 Fed. Reg. 21,094.

Once NOAA determined that the protections of the Endangered Species Act were no longer necessary, the Tribe notified NOAA that it wished to reinitiate a ceremonial and subsistence gray whale hunt. Although the Tribe had an express treaty right, the Tribe chose to move forward in cooperation with the United States government and seek an aboriginal subsistence whaling quota from the IWC. In 1996, NOAA agreed to seek IWC approval of a quota of five gray whales per year for the Tribe. The Tribe agreed in turn that if the IWC granted the quota, the Tribe would use the whales only for subsistence purposes and would cooperatively manage the hunt with the Federal government. The United States presented the Tribe's quota request to the IWC at its 1996 meeting but the IWC failed to approve the proposal.

In 1997, NOAA entered into a new agreement with the Makah Tribe. To address public concerns about so-called "resident" whales, the new agreement provided that whaling would occur only in the "open waters of the Pacific Ocean." NOAA also published an environmental assessment (EA) which concluded that the Makah whaling proposal would result in no significant environmental impacts.

At the 1997 IWC meeting, the Tribe's quota request was included as part of a joint United States-Russian proposal for a block quota of 620 whales over the five year period from 1998 through 2002. The United States and Russia explained to the IWC that 20 whales from this joint quota would be made available to the Makah Tribe subject to a cap of five whales per year. On October 23, 1997, the IWC approved the joint quota request by consensus. The IWC renewed the joint quota for another five years (2003-2007) at its 2002 meeting.

After the IWC approved the quota, the Makah Tribe adopted a gray whale management plan that included measures to ensure a humane hunt, such as requiring the use of a high-powered rifle, as well as training requirements, a permit system, and monitoring and enforcement provisions. In 1998, NOAA published a domestic quota of five gray whales per year for the Makah Tribe. 63 Fed. Reg. 16,701 (Apr. 6, 1998). Tribal whalers began preparing for the hunt in 1998 but no hunting occurred until the spring of 1999. In May 1999, a Tribal whaling crew hunted on four occasions and struck one gray whale. Once struck, the whale was dispatched eight minutes later with a high-powered rifle. The whale was towed back to Neah Bay where ceremonies were held, the whale was butchered, and the meat and blubber were distributed and consumed throughout the community. No additional whale hunting occurred in 1999. Two crews hunted on at least seven different occasions during the spring of 2000 but no whales were struck or landed.

On June 9, 2000, a divided panel of the Ninth Circuit reversed an earlier district court decision and held that NOAA violated the National Environmental Policy Act by entering into an agreement with the Tribe committing the government to support the Tribe's whaling proposal before the government had completed an EA. *Metcalf v. Daley*, 214 F.3d 1135, 1145 & n.3 (9th Cir. 2000). The majority did not identify any specific deficiency in the government's environmental analysis. As a remedy, the Court ordered NOAA to "suspend implementation" of the cooperative agreement, and "prepare a new EA." *Id.* at 1146.

The Tribe suspended its hunt immediately after the Ninth Circuit's ruling. NOAA rescinded the cooperative agreement and began work on a new EA. In response to public comments, NOAA consulted with the Tribe and expressed concerns about the impact of the hunt on the Pacific Coast Feeding Aggregation (PCFA), a group of approximately 200 to 250 gray whales that forage in the summer along the Pacific coast rather than migrating to more northerly feeding grounds in the Bering Sea. Although NOAA found no scientific basis to treat the PCFA as a discrete stock of marine mammals, NOAA advised the Tribe that it intended to evaluate the impacts of the Tribe's hunt on the PCFA. The Tribe addressed these concerns by revising its Management Plan to limit the number of whales that could be struck outside of whale migration periods or in the Strait of Juan de Fuca to a maximum of five strikes during the years 2001 and 2002 combined (or 2.5 strikes per year) – the low end of the PBR limit for the PCFA calculated by NOAA in its 2001 EA (NMFS 2001). The Tribe also adopted additional measures in its revised Management Plan to address public concerns about the safety of the hunt (Makah Tribal Council 2001).

After the Tribe adopted its revised Management Plan, NOAA published a second EA which found that the Makah whale hunt, conducted in accordance with the revised Management Plan, would have no significant environmental impacts (NMFS 2001). After the publication of the second EA, NOAA and the Tribe negotiated a new cooperative agreement and on December 7, 2001, NOAA published a quota of five gray whales for the Makah Tribe for the year 2002. 66 Fed. Reg. 64,378 (Dec. 13, 2001).

The new EA and quota were challenged in *Anderson v. Evans*, 371 F.3d 475 (9th Cir. 2004). The United States District Court for the Western District of Washington upheld NOAA's issuance of the quota and the second EA. However, the Ninth Circuit Court of Appeals reversed. The Ninth Circuit held that, notwithstanding the Tribe's whaling rights under the Treaty of Neah Bay, the Secretary of Commerce must waive the MMPA moratorium on taking marine mammals and a issue a permit under the MMPA before NOAA can authorize a tribal harvest of gray whales for ceremonial and subsistence purposes. In addition, the court held that NOAA should have prepared an Environmental Impact Statement (EIS) before authorizing a Makah gray whale quota because there were questions over the local impacts of the hunt on the gray whales that feed off of the Washington coast. The Court emphasized that it was *not* holding that the Tribe's treaty right to take whales had been abrogated, but only that NOAA must follow the MMPA waiver and/or permit process before permitting the Tribe to exercise that right. This waiver application is intended to address the requirements imposed by the *Anderson* decision.

III. Applicable Law.

A. Treaty of Neah Bay.

The Treaty of Neah Bay (Appendix B) is the only treaty between the United States and an Indian Tribe which expressly reserves the right to hunt marine mammals. Article IV of the Treaty of Neah Bay provides:

> The right of taking fish *and of whaling* or sealing at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the United States. . .

12 Stat. at 939 (emphasis added).

The Tribe's whaling and sealing rights under the Treaty of Neah Bay have not been abrogated by the MMPA. "Absent explicit statutory language, [the Supreme Court] has been extremely reluctant to find congressional abrogation of treaty rights." *Washington v. Washington Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658, 690 (1979). In order to abrogate Indian treaty rights, Congress must make its intention to abrogate those rights "clear and plain." *United States v. Dion*, 476 U.S. 734, 738-39 (1986). Thus, where a statute does not expressly abrogate Indian treaty rights, "[w]hat is essential is *clear evidence* that Congress *actually considered* the conflict between its intended action on the one hand and Indian treaty rights on the other, and *chose* to resolve that conflict by abrogating the treaty." *Id*. at 740 (emphasis added); *see also Minnesota v. Mille Lacs Band*, 526 U.S. 172, 202 (1999).

There is no evidence that Congress was even aware of the Makah Tribe's unique treaty right to take marine mammals when it enacted the MMPA, much less that it *chose* to abrogate those rights. On the contrary, neither the MMPA nor its legislative history even mention Indian treaty rights until Congress amended the MMPA in 1994. Far from abrogating those rights, the 1994 Amendments expressly preserved them. Section 14 of the 1994 Amendments provides: "Nothing in this Act including any amendments to the Marine Mammal Protection Act of 1972 made by this Act alters or is intended to alter any treaty between the United States and one or more Indian Tribes." Pub. L. 103-238, § 14 (Apr. 30, 1994); *see* Historical and Statutory Notes to 16 U.S.C. § 1361. Congress' stated intent in enacting this disclaimer was to "reaffirm that the MMPA does not in any way diminish or abrogate protected Indian treaty fishing or hunting rights." S. Rep. No. 220, 103rd Cong., 2nd Sess, 1994 USCCAN 514, 534. The language and legislative history of the MMPA thus evince absolutely *no* Congressional intent to abrogate the Tribe's Treaty right to take marine mammals.

It has been argued that the MMPA abrogates Indian treaty rights because it provides an exemption only for Alaska Natives but not other native groups. This argument misses the mark because Alaska Natives have no *treaty* rights to take marine mammals. The enactment of a special provision granting Native Alaskans special hunting rights cannot by negative implication abrogate the rights of other native groups that were already guaranteed such rights by treaty. In

United States v. Bresette, 761 F. Supp. 658, 663 (D. Minn. 1991), it was held that a similar Alaska Native exception in the Migratory Bird Treaty Act (MBTA) did *not* abrogate Indian *treaty* rights.[6]

Under well-established case law, the Tribe's unabrogated rights to take marine mammals are subject to regulation only where "necessary for conservation" of a particular marine mammal stock or species. *Washington v. Washington Passenger Fishing Vessel Assn.*, 443 U.S. 658, 682 (1979) ("treaty fishermen immune from all regulation save that required for conservation"); *Puyallup Tribe v. Department of Game*, 391 U.S. 392, 401 n.14 (1968) (power of the State to impose time and area restrictions on treaty right fishing is "measured by whether regulations are 'necessary' for the conservation of fish"); *Tulee v. Washington*, 315 U.S. 681, 684-85 (1942) (State may regulate the exercise of treaty fishing rights only if regulations are "necessary for the conservation of fish"). Federal courts have applied the conservation necessity principle to both state and federal regulations. *Anderson*, 371 F.3d at 497, n.21; *see also Midwater Trawlers Cooperative v. Dept. of Commerce*, 282 F.3d 710, 718-19 (9th Cir. 2002) (United States must employ conservation necessity principle when setting tribal fishing allocations); *United States v. Williams*, 898 F.2d 727, 730 & n.4 (9th Cir. 1990) ("government [has] the burden of establishing the conservation necessity of state *and federal* wildlife laws against members of tribes with hunting and fishing treaty rights").

The "conservation necessity" principle is not weakened by the "in common with" language in the Treaty. The purpose of that language was to secure access for non-Indians to the Tribe's usual and accustomed grounds, not to provide a basis for restricting the Tribe's hunting and fishing rights. *United States v. Washington*, 384 F. Supp. 312, 357 (W.D. Wash. 1974) (nothing to indicate that Tribe was "told that its existing fishing activities or tribal control over them would in any way be restricted or impaired by the treaty"), *aff'd*, 520 F.2d 676 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976).

In the Indian treaty rights context, the term "conservation" is defined restrictively to mean "those measures which are reasonable and necessary to the *perpetuation of a particular run or species*." *Id.* at 342 (emphasis added). The *government* has the "burden of proof" in demonstrating a "conservation necessity" exists. *Id.* To carry its burden, the government must show that:

- a "specific statute or regulation is required to prevent demonstrable harm to the actual conservation of fish,"

[6] The Bald Eagle Protection Act (BEPA) which was held to abrogate treaty rights in *United States v. Dion*, 476 U.S. 734, 740-43 (1986), is distinguishable from the MMPA. The BEPA contains a sweeping prohibition on the taking of eagles with a narrow exception allowing the Secretary of the Interior to issue permits allowing eagles to be taken "for the religious purposes of Indian tribes." *Dion*, 476 U.S. at 740, citing 16 U.S.C. § 668a. The legislative history of the BEPA clearly showed that Congress was aware of Indian on-reservation hunting of eagles, considered such hunting to be part of the problem calling for the legislation, and "expressly chose to set in place a regime in which the Secretary of the Interior had control over Indian hunting, rather than one in which Indian on-reservation hunting was unrestricted." *Dion*, 476 U.S. at 743. By contrast, the MMPA provides numerous exceptions to the moratorium on taking marine mammals and contains *no* provisions addressing Indian *treaty* harvests.

- “existing tribal regulation or enforcement is inadequate to prevent demonstrable harm to the actual conservation of fish,” and,

- “the conservation required cannot be achieved to the full extent necessary . . . by other less restrictive means or methods.”

Id. at 415. Since *United States v. Washington,* these standards have been accepted and applied as established law. *See Midwater Trawlers,* 282 F. 3d at 718-19; *Shoshone-Bannock Tribes v. Fish and Game Comm'n*, 42 F.3d 1278, 1283 (9th Cir. 1994); *Williams*, 898 F.2d at 730; *United States v. Oregon,* 718 F.2d 299, 304 (9th Cir. 1983); *United States v. Michigan*, 653 F.2d 277, 279 (6th Cir.), *cert. denied*, 454 U.S. 1124 (1981); *Lac Courte Oreilles Band v. Wisconsin*, 668 F. Supp. 1233, 1236, 1241 (W.D. Wis. 1987); *Mille Lacs Band v. Minnesota*, 952 F. Supp. 1362, 1380 (D. Minn.), *aff'd*, 124 F.3d 905 (8th Cir. 1997), *aff'd,* 526 U.S. 172 (1999).

In sum, the Treaty of Neah Bay has not been abrogated and provides the Makah Tribe with special whaling rights not shared by other United States citizens. NOAA may regulate the exercise of these rights only if it can demonstrate that its regulations are necessary for conservation. To satisfy the “conservation necessity” standard, federal regulations restricting the Tribe's whaling rights may be promulgated only where necessary to preserve a particular species or stock of whales and, taking existing Tribal regulations into consideration, where they are the least restrictive means available to achieve this purpose.

B. Federal Trust Responsibility.

Courts have long recognized that a “special relationship” exists between the United States and Indian tribes which provide the Constitutional basis for legislation, treaties, and Executive Orders that grant unique rights to Indian tribes. *Morton v. Mancari*, 417 U.S. 535, 551-53 (1974). This relationship imposes fiduciary duties upon the government to faithfully carry out treaty and other legal mandates enacted for the benefit of Indian tribes. *Seminole Nation v. United States*, 316 U.S. 286, 296-97 (1942) *Cherokee Nation v. Georgia*, 30 U.S. 1(5 Pet.) (1831); *see also* Chambers, *Judicial Enforcement of the Federal Trust Responsibility*, 27 Stan. L. Rev. 1213 (1975); Cohen, *Handbook of Federal Indian Law* 220-21 (1982 ed.). These fiduciary obligations are especially strict where they involve implementation of treaty provisions:

> In carrying out its treaty obligations with the Indian tribes, the Government is something more than a mere contracting party. Under a humane and self-imposed policy which has found expression in many acts of Congress and numerous decisions of [the Supreme] Court, it has charged itself with moral obligations of the highest responsibility and trust.

Seminole, 316 U.S. at 296-97.

The scope of the Federal trust relationship is broad and applies to all federal agencies. *Pyramid Lake Paiute Tribe v. United States Navy*, 898 F.2d 1410, 1420 (9th Cir. 1990); *Nance v.*

Environmental Protection Agency, 645 F.2d 701, 711 (9th Cir.), *cert. denied*, 454 U.S. 1081 (1981). The United States government has an obligation to protect tribal property, including Indian hunting and fishing rights. *Lincoln v. Vigil*, 508 U.S. 182, 194 (1993) ("The law is 'well established that the Government in its dealings with Indian tribal property acts in a fiduciary capacity.'") (quoting *United States v. Cherokee Nation*, 480 U.S. 700, 707 (1987)); *Pyramid Lake*, 898 F.2d at 1420. Federal agencies have a duty to "represent the Tribe's interests forcefully despite [their] other representative obligations."[7] *White Mountain Apache Tribe v. Hodel*, 784 F.2d 921, 925 (9th Cir.) *cert. denied*, 479 U.S. 1006 (1986).

The requirements of the general trust responsibility are enhanced by the language and negotiating history of the Treaty of Neah Bay. Article IV of the Treaty of Neah Bay "secures" to the Tribe the right of whaling at usual and accustomed grounds and stations. In the treaty negotiations, the Tribe was "invited by the white negotiators to rely and in fact did rely on the good faith of the United States to protect that right." *Fishing Vessel*, 443 U.S. at 667. The government's "promise that the treaties would protect [the Tribe's] source of food and commerce were crucial in obtaining the Indian's assent." *Id.* at 676. In short, NOAA has a special obligation to consider and protect the treaty whaling rights of the Makah Tribe when it considers the Tribe's request for a waiver from the MMPA take moratorium.

C. International Convention on the Regulation of Whaling.

The International Convention on the Regulation of Whaling (ICRW) was signed in 1946 to "provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry." 62 Stat. 1716 (Dec. 2, 1946). The ICRW establishes the IWC, which is composed of one member from each signatory government, whose primary function is to adopt whaling regulations known as the "Schedule." The Schedule and all amendments thereto are deemed to be part of the ICRW itself. Arts. I, III, V. Amendments to the Schedule may not allocate quotas to any group of whalers. Art. V, § 2.

The original Schedule prohibited the harvest of gray whales, "except when the meat and products of such whales are to be used exclusively for local consumption by the aborigines." 62 Stat. at 1723. Since the late 1970s, aboriginal subsistence whaling has been subject to quotas and other regulations adopted by the IWC. Paragraph 13 of the Schedule sets strict guidelines for the setting of aboriginal subsistence whaling quotas. For stocks at or above a maximum sustained yield level (MSYL), aboriginal subsistence catches are permitted so long as total removals do not exceed 90 per cent of maximum sustained yield (MSY). For stocks below the MSYL but above a

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[7] These trust obligations have been implemented in Secretarial Order No. 3206, issued June 5, 1997 and signed by the Secretaries of Interior and Commerce, which directs NOAA to carry out its responsibilities under the Endangered Species Act in a manner that harmonizes the Federal trust responsibility to tribes, tribal sovereignty, and NOAA's statutory missions, so as to avoid or minimize the potential for conflict and confrontation. Executive Order 13175, dated November 6, 2000, requires agency policy making to be guided by principles of respect for Indian treaty rights and responsibilities that arise from the unique legal relationship between the Federal Government and Indian tribal governments. On issues relating to treaty rights, the Executive Order directs each agency to explore and, where appropriate, use consensual mechanisms for developing regulations.

certain minimum level, aboriginal subsistence catches are permitted so long as they are set at levels which will allow whale stocks to move to the MSYL.[8]

In 2002, the IWC renewed the aboriginal subsistence gray whale quota for the Eastern North Pacific stock and authorized the taking of up to 620 gray whales between 2003 and 2007, with a maximum of 140 in any one year. By bilateral agreement between the United States and the Russian Federation, up to 20 whales may be taken by the Makah Tribe over the five year quota period, with a maximum of five whales in any one year. The IWC Schedule also prohibits the taking of a gray whale calf or a gray whale accompanied by a calf.

The United States has implemented the ICRW through the Whaling Convention Act (WCA). 16 U.S.C. §§ 916 *et seq.* Pursuant to the WCA, NOAA has adopted aboriginal subsistence whaling regulations which are set out at 50 C.F.R. Part 230. The regulations permit whaling captains designated by a Native American whaling organization which has been recognized by NOAA to engage in subsistence whaling in accordance with IWC quotas and regulations. 50 C.F.R. §§ 230.5, 230.6. NOAA has entered into three cooperative agreements with the Tribe (in 1996, 1997, and 2001) recognizing the Makah Tribal Council as a Native American whaling organization and permitting the Council to issue permits to whaling captains consistent with IWC quotas and regulations.

D. MMPA.

1. Policies and Purposes of the Act.

The MMPA was adopted in 1972 out of concern that "certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities." 16 U.S.C. § 1361(1). It is the goal of the MMPA that marine mammal "species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part." *Id.* § 1361(2). Consistent with this major objective, species and population stocks "should not be permitted to diminish below their optimum sustainable population." *Id.* The MMPA defines the term "optimum sustainable population" to mean:

> with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and health of the ecosystem of which they form a constituent element.

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[8] Paragraph 10(a) of the Schedule defines a "Sustained Management Stock" (SMS) as any "stock which is not more than 10 per cent of Maximum Sustainable Yield (hereinafter referred to as MSY) stock level below MSY stock level, and not more than 20 per cent above that level; MSY being determined on the basis of the number of whales."

16 U.S.C. § 1362(9).

2. Waiver and Permit Requirements.

Section 101(a) of the MMPA imposes a moratorium on the taking of marine mammals, except under regulations and permits adopted by the Secretary of Commerce under the Act. 16 U.S.C. § 1371(a). However, the Secretary may waive the moratorium if he determines, "on the basis of the best scientific information available," in consultation with the Marine Mammal Commission, and "having due regard for the distribution, abundance, breeding habits and times and lines of migratory movements" of the animals in question, that a waiver is "compatible" with the MMPA. *Id.* § 1371(a)(3)(A). To waive the moratorium, the Secretary must also "be assured that the taking of such marine mammals is in accord with sound principles of resource protection and conservation as provided in the purposes and policies" of the Act. *Id.* A waiver of the moratorium requires the promulgation of regulations and in some cases may also require the issuance of permits. *Id.*

The process for adopting regulations authorizing the taking of marine mammals is set out in Section 103 of the MMPA, 16 U.S.C. § 1373. Such regulations must be promulgated "on the basis of the best scientific evidence available" and in consultation with the Marine Mammal Commission. 16 U.S.C. § 1373(a). The regulations must "insure that such taking will not be to the disadvantage of those species and population stocks, and will be consistent with the purposes and policies" of the Act. *Id.* In prescribing such regulations, the Secretary must give full consideration to all relevant factors, including the effect of such regulations on existing and future levels of marine mammal species and population stocks; the government's existing international treaty and agreement obligations; the marine ecosystem and related environmental considerations; the conservation, development and utilization of fishery resources; and the economic and technological feasibility of implementation. *Id.* § 1373(b).

MMPA take regulations may include restrictions on the number of animals which may be taken by permit in any calendar year; the age, size or sex of the animals which may be taken; the season or other time period within which animals may be taken; and the manner and locations in which animals may be taken. 16 U.S.C. § 1373(c). Any such regulations must be made "on the record after opportunity for an agency hearing on both the Secretary's determination to waive the moratorium . . . and on such regulations." *Id.* § 1373(d). In addition to other requirements imposed by law with respect to agency rulemaking, the Secretary must publish and make available to the public before or concurrent with the publication in the Federal Register of his intention to prescribe regulations a statement setting forth:

(1) the estimated existing levels of the species and population stocks of the marine mammal concerned;

(2) the expected impact of the proposed regulations on the optimum sustainable population of such species or population stock;

(3) the evidence before the Secretary upon which he proposes to base such

regulations; and

(4) any studies or recommendations made by or for the Secretary or the Marine Mammal Commission that relate to the establishment of such regulations.

Id. The process for issuing permits is set out in Section 104 of the MMPA, 16 U.S.C. § 1374. Any permit issued under Section 104 of MMPA must be consistent with the regulations promulgated under Section 103 and specify the number and kind of animals which are authorized to be taken, the location and manner in which they may be taken, the period during which the permit is valid, and any other terms and conditions deemed appropriate by the Secretary. *Id.* § 1374(b). To issue a permit, the Secretary must also determine that the proposed manner of taking will be humane.

3. The Potential Biological Removal (PBR) Approach to Achieving Optimum Sustainable Population Levels.

In 1994, Congress amended the MMPA to incorporate the potential biological removal (PBR) approach to measuring effects of marine mammal takes on the optimum sustainable population (OSP) of stocks and populations. The need for the PBR approach was brought on by the decision in *Kokechik Fishermen's Ass'n v. Secretary of Commerce*, 839 F.2d 795 (D.C. Cir. 1988), which held that NOAA could not issue a permit for the incidental taking of one marine mammal species in a commercial fishery where the fishing operation also incidentally took other species and insufficient information existed to determine the population status of those species.

Following *Kokechik*, Congress amended the MMPA to establish a five-year interim exemption from the Act's prohibition on taking marine mammals incidental to most U.S. commercial fishery operations, while directing NOAA to use the five-year period to collect data on marine mammal stocks and the extent of commercial fishery interactions with those stocks, and to develop a proposed regime to govern interactions between commercial fishing operations and marine mammals after the exemption expired.

NOAA issued its proposed regime along with a legislative environmental impact statement in November 1992. As explained by the House Committee which reported out the 1994 Amendments to the MMPA:

> The goal of the proposal – like the goal of the Act – was to have all marine mammal stocks reach their optimum sustainable population [OSP]. NMFS proposed that levels of incidental take quotas be determined based on the concept of "Potential Biological Removal" (PBR): the maximum number of animals, excluding natural mortalities, that may be removed from a population without affecting its ability to reach or maintain OSP.

H.R. Rep. No. 439, 103rd Cong., 2d Sess. (Mar. 21, 1994).

Congress enacted the PBR approach into law in the 1994 Amendments to the MMPA.

Pub. L. 103-238, 108 Stat. 544 (Apr. 30, 1994). The 1994 Amendments incorporate the following definition into Section 3 of the Act:

> The term "potential biological removal level" means the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The potential biological removal level is the product of the following factors:
>
> > (A) The minimum population estimate of the stock.
> >
> > (B) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size.
> >
> > (C) A recovery factor of between 0.1 and 1.0.

16 U.S.C. § 1362(20).

The 1994 Amendments also required NOAA to produce stock assessment reports (SARs) for each marine mammal stock which occurs in waters under the jurisdiction of the United States. These SARs must be based on the best scientific information available and describe for each stock, *inter alia*, its geographic range, including any seasonal or temporal variation in its range; an estimate of the stock's minimum population size, its current and maximum net productivity rates and current population trend; an estimate of the annual human-caused mortality and serious injury of the stock by source; and an estimate of the potential biological removal level for the stock, describing the information used to calculate it, including the recovery factor. 16 U.S.C. § 1386(a). SARs must be revised at least once every three years.[9] *Id.* § 1386(c).

In accordance with the 1994 Amendments to the MMPA, NOAA currently evaluates all human-caused mortalities in relation to a stock's PBR level. The PBR approach is NOAA's established management strategy for achieving the primary goal of the MMPA, which is to prevent any marine mammal stock from being reduced below its OSP level.[10]

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[9] Congress addressed the issue of takings incidental to commercial fisheries by requiring the development of incidental take plans designed to reduce incidental takes of stocks below the PBR level. *See* 16 U.S.C § 1387(f). Subsistence harvests of marine mammals by Alaska Natives were not affected by the PBR calculations. *Id.* § 1386(e).

[10] NOAA's most recent stock assessment for the Eastern North Pacific stock of gray whales is for 2003 (Angliss and Lodge 2004). The stock assessment is available at: http://www.nmfs.noaa.gov/prot_res/readingrm/MMSARS/sar2003akfinal.pdf

IV. Life History and Population Status of the Eastern North Pacific Stock of Gray Whales.

A. General Life History and Distribution.

Gray whales (*Eschrictius robustus*) are baleen whales classified in the suborder Mysticeti and are the only species in the monotypic family Eschrichtiidae. The generic name, *Eschrichtius*, was given in recognition of Daniel Eschrict, a 19th century zoologist, and the specific name *robustus* is Latin for "oaken" or "strong." Gray whale nomenclature is further reviewed in Rice and Wolman (1971) and the fossil record and evolution of gray whales is described in Barnes and McLeod (1984).

Gray whales historically existed in both the Pacific and Atlantic Oceans. The Atlantic population was extirpated by the end of the 17th Century (Mead and Mitchell 1984). Gray whales in the Pacific Ocean are divided into two distinct stocks: the Eastern North Pacific gray whale stock (sometimes referred to as the Chukchi-California stock), which is fully recovered from exploitation by commercial whaling and migrates from the Bering and Chukchi Seas to Baja Mexico (Swartz 1986); and the critically depleted Western North Pacific stock (also referred to as the "Korean-Okhotsk" stock) which migrates along the east coast of Asia (Rice and Wolman 1971).

Gray whales are easily distinguished from other whales. Gray whales are gray in coloration and have patches of lice and barnacles, giving them a mottled appearance. They lack a dorsal fin. However, they have a dorsal hump which is followed by a series of knobs or "knuckles" which are distinctly visible as they arch. Adult gray whales are between 11 and 15 m in length, with females being larger than males.

B. Migration.

The Eastern North Pacific stock of gray whales feeds in the summer in the northern Bering and Chukchi Seas and winters off of Baja California, Mexico (Scammon 1874). Wintering gray whales are found within the lagoons and protected waters of the western Baja Peninsula and, to some extent, along the Mexican mainland and in the Gulf of California (Swartz et al. 2000). The northbound migration begins with newly pregnant females, adult males, anestrous females and immature whales of both sexes which leave the wintering grounds around mid- to late-February (Poole 1984) and begin to arrive in the Bering Sea from late-March through May (Braham 1984). Females with calves are the last to leave southern waters and depart between late-March and May (Swartz et al. 2000). Females with calves travel more slowly than whales without calves to accommodate nursing as well as the slower swimming speed of the calves (NMFS 2001). Cow-calf pairs enter the Bering Sea from May through June (Braham 1984).

The southbound migration also occurs in phases. Gray whales are moving out of the Bering Sea by late-November, beginning with near-term pregnant females and followed by oestrus females, mature males, and then juveniles of both sexes (Swartz et al. 2000). Gray whales begin to arrive in the waters off Baja in late-December and reach highest densities by mid-February (Jones and Swartz 1984). The gray whale migration is approximately 10,000 km each way (Scammon 1874).

The timing of migration at certain points along the Pacific coast is more thoroughly presented in Pike (1962), Swartz (1986), Rugh et al. (1999), and Swartz et al. (2000). According to this data, southbound whales are present along the Washington coast beginning in early December, peaking around 5 January, and ending in the first week of February. Northbound whales are present from late-February into June (NMFS 2001).

On both the northbound and southbound migration, gray whales tend to follow the shoreline, although they also traverse larger expanses of open water. In Washington, northbound migrants averaged 11.9 km from shore (Green et al. 1995), while southbound migrants have been seen up to 47 km from shore (Shelden et al. 1999), with an average distance of 25.2 km from shore (Green et al. 1995). A hypothesis explaining why gray whales are farther offshore during the southbound migration in Washington is that gray whales may take a more direct route from central Vancouver Island to the mouth of the Columbia River, instead of taking the longer route following the coast line (Green et al. 1995). Also, gray whales may feed during the northward migration and therefore travel closer to the coast, while during the southbound migration they already have a positive energy balance when they depart from the Arctic feeding grounds.

C. Reproduction.

Both male and female gray whales become sexually mature between 5 and 11 years of age, with an average of 8 years (Rice and Wolman 1971). Mature females breed in two year cycles, producing a calf every other year (Swartz 1986). Breeding occurs during the southward migration, with a mean conception date of 5 December (Rice and Wolman 1971). Females that have not successfully bred may enter a second estrus phase approximately 40 days later (Rice and Wolman 1971). Gestation lasts 418 days (Rice 1983) with a median birth date of 27 January (Rice et al. 1981). Calves are approximately 4.57 m long at birth (Rice 1983). The sex ratio of calves is 1:1 (Jones and Swartz 1984; Rice and Wolman 1971). Gray whale calves wean in August (Rice and Wolman 1971).

D. Feeding Behavior and Prey.

Gray whales employ a variety of foraging methods including benthic suction, engulfing, and skimming and feed on a wide variety of prey (Nerini 1984). Nerini (1984) reviewed reports on gray whale stomach analyses and listed the presence of over 90 genera. Gray whales primarily feed on benthic invertebrates. In the Arctic, the most common prey item is benthic tube-dwelling amphipods which can be found at densities as high as 23,780 individuals per square meter (Nerini 1984). The benthic foraging behavior is disruptive to the benthos (Oliver and Slattery 1985) and may be considered a specialized type of niche construction (Odling-Smee et al. 1996). The gray whales' ability to use different foraging methods and their ability to prey upon a variety of species may account for their more rapid recovery from commercial whaling in comparison with other great whale species (Nerini 1984; Moore et al. 2001).

Gray whales do not feed significantly during their southbound migration (Perryman and Lynn 2002). Oliver et al. (1983) did not find compelling evidence of benthic feeding in the winter grounds. There are reports of mud plumes observed on the calving grounds (e.g., Norris et al. 1977), but for the most part, it appears that gray whales fast during the winter (Perryman and Lynn 2002) and can lose 11-29% of their weight between the south- and northbound migrations (Rice and Wolman 1971).

E. Natural and Human-Related Mortality.

Natural mortality of gray whales includes predation by killer whales (*Orcinus orca*) (Baldridge 1972; Goley and Straley 1994), disease, entrapment in ice (IWC 2003), starvation, and old age. NOAA Fisheries maintains a stranding database of marine mammals. The average number of gray whales reported as stranded between 1995 and 1998 was 38 per year (Angliss and Lodge 2004). In 1999 and 2000, the stranding rate increased to 273 and 355, respectively (Angliss and Lodge 2004). The actual cause of death for these stranded whales is largely unknown (IWC 2003). Since 2000, the stranding rate has returned to pre-1999 levels (Angliss and Lodge 2004).

Eastern North Pacific gray whales have been traditionally hunted by Eskimos and Chukotka Natives in the Arctic, and by several Tribes from the Aleutians to California (O'Leary 1984). Shore-based commercial whaling occurred in California and Baja California from about the mid-1800's to 1900 (Henderson 1984; Sayers 1984). Modern whaling from ocean-going vessels occurred from 1914 to 1946 and was pursued by the United States, Japan, Norway, and the Soviet Union (Reeves 1984). Gray whales were afforded some protection from commercial harvest by nations that were signatory to the 1937 International Agreement for the Regulation of Whaling and received more complete protection under the 1946 International Convention for the Regulation of Whaling (ICRW) (Reeves 1984). The ICRW banned all commercial harvest of gray whales while continuing to allow for aboriginal subsistence use. From 1959 until 1969, 316 gray whales were taken under scientific research permits issued by the United States Bureau of Commercial Fisheries (now called NOAA Fisheries) (Rice and Wolman 1971; Perryman and Lynn 2002).

Data on aboriginal subsistence gray whale harvest is available on the IWC website (http://www.iwcoffice.org/_documents/table_aboriginal.htm). The Soviet Union operated a large whale catcher ship on behalf of Chukotka Natives between 1967 and 1991, harvesting gray whales at an average rate of 165 gray whales per year from 1985 through 1991. After the collapse of the Soviet Union, aborigines in Chukotka resumed hunting using traditional methods from their own small craft, and averaged an annual harvest of 96 gray whales from 1994 through 2002. Aboriginal hunters in Alaska harvested one gray whale in 1985, two in 1986, one each in years 1988 and 1989, and two in 1995. The Makah Tribe harvested one gray whale in the spring of 1999. As indicated in Section III.C, in 2002, the IWC renewed the gray whale quota for the Eastern North Pacific stock and authorized the taking of up to 620 gray whales between 2003 and 2007, with a maximum of 140 in any one year. By bilateral agreement between the United States and the Russian Federation, up to 20 whales may be taken by the Makah Tribe over the five year quota period, with a maximum of five whales in any one year (IWC 2002).

Aside from aboriginal harvest, other sources of human-related mortality and serious injury of gray whales include ship strikes (average of 1.2 gray whales per year) and incidental catch in commercial fisheries (average of 8.9 gray whales per year) (Angliss and Lodge 2004).

F. Abundance.

The Eastern North Pacific gray whale stock is considered to be one of the best studied cetacean populations in the world (Swartz 1986) largely because of the stock's close proximity to shore throughout its range. Because the stock migrates close to shore and has a predictable migration window, it is feasible to conduct shore-based sighting surveys to estimate abundance. Gray whales have been surveyed during their southbound migration at or near Granite Canyon, California since 1967 (Buckland and Breiwick 2002; Angliss and Lodge 2004). The raw count data is then transformed into an abundance estimate after accounting for the following factors: a correction for missed whales; a correction for whales passing during periods when no observers are present; differential sightability by observers, pod size, distance offshore, and environmental conditions; errors in pod size estimation; covariance within the corrections due to variable sightability by pod size; and a correction for a difference between diurnal and nocturnal travel rates (Hobbs and Rugh 1999; Rugh et al. 2003).

The population estimate used in the most recent NOAA Stock Assessment Report (Angliss and Lodge 2004) for Eastern North Pacific gray whales is 26,635 (CV = 10.06%; 95% log normal confidence interval = 21,878 to 32,427), which was based on the 1997/98 southbound migrant observation season (Hobbs and Rugh 1999). The population had an intrinsic growth rate of 2.5% (SE = 0.3%) from 1967/68 to 1995/96 (Buckland and Breiwick 2002), despite the annual removal of up to 165 whales by, or on behalf of, Russian natives. Similar abundance surveys were also conducted in the 2000/2001 and 2001/2002 seasons which resulted in abundance estimates of 18,761 (CV = 10%; 95% log-normal confidence interval = 15,249 to 22,812) and 17,414 (CV = 10.06%; 95% log-normal confidence interval = 14,322 to 21,174), respectively (Rugh et al. 2002). Rugh et al. (2003) recalculated the three most recent abundance estimates due to a new computer program for matching sightings and the use of an alternative observation station in 1998 (due to a storm washing out an access road to the usual observation station). The revised estimates are: 27,958 in 1997/98 (CV = 10.21%; 95% log-normal confidence interval = 22,901 to 34,131), 18,246 in 2000/01 (CV = 9.36%; 95% log-normal confidence interval = 15,195 to 21,910), and 16,848 in 2001/02 (CV = 9.49%; 95% log-normal confidence interval = 13,995 to 20,283). The corrected 2001/02 estimate reported in Rugh et al. (2003) is the most reliable and current abundance estimate for this stock, and will be used in the remainder of this document rather than the 1997/98 abundance estimate reported in the most recent NOAA Stock Assessment Report (Angliss and Lodge 2004).

Trends in gray whale calf production have been monitored using three methods: surveying for calves from shore and from aircraft in central California during the northbound migration (Perryman et al. 2002; Perryman et al. 2004); counting calves from shore at Granite

Canyon, California, during the southbound migration (Shelden and Rugh 2001); and conducting aerial and vessel surveys for calves in the breeding lagoons of Baja California (Urban et al. 2003). Calf production is used in modeling population dynamics of gray whales (Wade and Perryman 2002). Gray whale calf production has also been correlated with the distribution of seasonal ice in the Arctic (Perryman et al. 2002).

Wade and Perryman (2002) calculated the carrying capacity (K) for this stock to be approximately 22,000 gray whales. Therefore, the population likely surpassed its carrying capacity in the late 1990's when it reached an estimated abundance of almost 28,000 whales (Rugh et al. 2003). The increased stranding rate observed in 1999 and 2000 (Le Boeuf et al. 2000; Angliss and Lodge 2004), as well as the low calf production observed over this time period (Le Boeuf et al. 2000; Perryman et al. 2002) were probably symptoms of the fact that the Eastern North Pacific stock of gray whales had exceeded its carrying capacity. The stranding rate has returned to normal levels (Angliss and Lodge 2004) as has calf production. The 2004 calf production estimate was greater than any other recorded (Perryman et al. 2004). As noted by Perryman et al. (2004), the ENP population might actually be higher than the most recent abundance estimates because some animals may not have migrated as far south as Granite Canyon in 2000/01 or 2001/02 (Rugh et al. 2003).

G. Pacific Coast Feeding Aggregation.

Most gray whales from the Eastern North Pacific stock migrate north of the Aleutian chain to feed during the summer and fall. However, some gray whales do not make a full migration and have been observed from Kodiak, Alaska to California during non-migratory periods (Calambokidis et al. 2003). Whales in this group arrive and depart from their wintering grounds concurrently with the overall population that migrates to the Arctic (Calambokidis et al. 2002a). Pike (1962) referred to this group as "summer residents." Because the term "summer resident" is a misnomer, NMFS (2001) referred to this group as the Pacific Coast Feeding Aggregation (PCFA). For the purposes of this request, the "PCFA" is defined as any whale found in the photo-identification database maintained by NOAA's National Marine Mammal Laboratory (NMML) which has been observed south of Alaska from June 1 through November 30 in any year.

Photo-identification studies of gray whales in the PCFA have been undertaken since 1970 (Hatler and Darling 1974) using unique markings on the sides of the gray whale which are revealed as the whales arch (Darling 1984). Darling (1984) hypothesized that gray whales seen along the coast of British Columbia were apart of a larger 'northwest coast' group that numbered at least 100 animals. Calambokidis et al. (2002a) reported that there were approximately 180 gray whales in the PCFA based on a mark-recapture abundance estimate for 1998. Calambokidis et al. (2002b), using a similar approach, reported an abundance estimate for the PCFA of 322 gray whales for 2001; and reported approximately 270 gray whales for 2002 (Calambokidis et al. 2003) (both papers only use whales seen after June 1 because whales that are seen prior to that date are typically never seen again). Calambokidis et al. (2004) used a dataset from 1998-2003 from California to Northern Vancouver Island and whales observed after June 1 and used an open population model approach to derive an abundance estimate of 200 gray whales (CV = 10.3%) for

2003, with a 2003 estimate of 176 whales (CV = 11.6%) based strictly on whales that were seen in multiple years.

In addition to the utility of photo-identification for mark-recapture population analyses and abundance estimates, the ability to identify individual gray whales through photo-identification also provides an opportunity to assess movement, tenure, and site fidelity to the Pacific coast south of Alaska. Those gray whales from the PCFA that have longer interannual sighting histories also tend to be seen in multiple survey regions throughout the PCFA (Calambokidis et al. 2004). As an example of the wide-ranging movements made by PCFA whales, a single whale observed in Kodiak, Alaska in 2002 had previously been seen along the west coast of Vancouver Island in 1999, as early as 1995 in the Cape Caution, BC area, and as early as 1992 in the Clayoquot Sound, BC survey area (Calambokidis et al. 2003). Another whale observed off southern Vancouver Island on 6 July 2003 was later seen in Kodiak on 9 August 2003; corresponding to a direct route movement of 1,104 nautical miles in 34 days (Calambokidis et al. 2004)

Calambokidis et al. (2004) reported that the length of time a whale was observed within a season proved to be a valuable tool in understanding the overall dynamics of the PCFA. A minimum residency tenure (MRT), defined as the time between first and last dates photographed within a year, was calculated to examine the likelihood that a particular whale would be seen the following year. Sixty-eight percent of the whales with a MRT of one week or less were seen during July-September, well outside the migration time period. Whales with longer MRTs in their first year observed were more likely to return in subsequent years. The authors suggested that the mechanism for whales with longer MRTs, and thus higher probability of returning the following year, is likely related to the foraging success that they encounter during the previous year.

Calambokidis et al. (2004) noted that while it makes logical sense when comparing interchange rates of gray whales between survey regions south of the Aleutian Island chain that immediately adjacent survey areas show stronger interchange rates in comparison with interchange rates between survey areas further to the north or south of the site, these results also suggest that individual gray whales regularly return to particular feeding areas. Gray whales in the PCFA were most likely to be re-sighted in adjacent survey area, thus indicating fidelity to an area that is smaller than the PCFA region as a whole, but larger than a single survey region (Calambokidis et al. 2004). The area to the north of the Makah U&A (i.e., the Southern Vancouver Island survey area) as well as the survey area to the south of the Makah U&A (i.e., the Oregon survey area) exhibit the highest degree of interchange. Thus, the authors recommended combining these regions as the appropriate geographic range for assessing local impacts and establishing subquotas for the PCFA (Calambokidis et al. 2004). The three survey regions of Oregon, Northern Washington and the Strait of Juan de Fuca (Makah U&A), and Southern Vancouver Island make up the combined survey area are referred to in this document as the ORSVI survey area.

No genetic differences have been detected between the PCFA and the overall migratory population (Steeves et al. 2001). Steeves et al. (2001) reported that there was a male bias in the

PCFA of 1.7 to 1 (males to females; n = 16), although given the small sample size the bias was not considered to be statistically significant. Ramakrishnan et al. (2001) reported a statistically significant male bias in the PCFA of 1.8 to 1 (males to females; n = 45). The potential explanations of the observed sex bias is that either females are feeding elsewhere in the PCFA and are not being sampled by researchers or that the PCFA is not a separate, closed population (i.e., a population that is experiencing only internal recruitment) (Ramakrishnan et al. 2001). Lang et al. (2004) proposed that the reason for the high genetic diversity observed in samples collected during the summer from Western North Pacific gray whales was the dispersal of males from the Eastern North Pacific gray whale stock into Western North Pacific gray whale feeding grounds. Using both simulations and empirical evidence, Ramakrishnan et al. (2001) reject the hypothesis that the PCFA is a maternal genetic isolate and that both the number of haplotypes and the diversity of haplotypes found in the PCFA is greater than other baleen whale populations of similar size. The level of haplotypic diversity in the PCFA (0.93; Ramakrishnan et al. 2001) is comparable to the haplotypic diversity seen in the Eastern North Pacific stock of gray whales (0.95 ± 0.02; LeDuc et al. 2002).

Given the best available information, NOAA has managed the PCFA as part of the Eastern North Pacific stock of gray whales (Swartz et al. 2000; Angliss and Lodge 2004). The IWC recognizes the existence of a feeding aggregation of gray whales along the Pacific Coast south of Alaska, but likewise continues to manage the Eastern North Pacific stock of gray whales as a single stock (IWC 2000). However, to avoid local depletion of a feeding aggregation in which individuals show site fidelity to the region and thereby address the MMPA policy that gray whales remain a “significant functioning element of the ecosystem,” 16 U.S.C. § 1361(2), the Tribe’s waiver request contains management measures, including time and area restrictions and annual bycatch level (ABL) subquotas, designed to minimize impacts to those whales that exhibit inter-annual site fidelity to the Pacific coast south of Alaska.

V. Expected Impact Of The Requested Waiver.

A. Effects on the Eastern North Pacific Stock of Gray Whales.

One of the primary goals of the MMPA is to maintain marine mammal populations at or above an optimum sustainable population (OSP). 16 U.S.C. § 1361(2) and (6). OSP is defined as "with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element." 16 U.S.C. § 1362(9). NOAA has quantified OSP as a population size which ranges between a stock's maximum net productivity level (MNPL) and its carrying capacity (K). *See* 50 C.F.R. § 216.3.

Wade and Perryman (2002) completed an assessment of the Eastern North Pacific gray whale population that incorporated the time series from 1967/68 to 2001/02. They used four different scenarios using the abundance estimates as well as: (1) using all the calf estimates, (2) using none of the calf estimates, (3) using all of the calf estimates except the 1980 and 1981 estimates, and (4) using all of the calf estimates plus an assumed value in 2002 (which was not available at the time of the analysis), to estimate the carrying capacity to be 22,610 (90% CI = 19,830 to 28,470), 21,740 (90% CI = 19,480 to 35,430), 22,110 (90% CI = 19,840 to 26,880), and 22,590 (90% CI = 20,020 to 30,280), respectively for each scenario. For the purposes of the Tribe's waiver request, K will be expressed as a range between 21,740 and 22,610 animals (the lowest and highest values reported among the four scenarios).

Historically, MNPL has been expressed as a range of values (generally 50 to 70 percent of K) determined theoretically by estimating the stock size in relation to the pre-exploitation stock size, which would produce the maximum net increase in population. 42 Fed. Reg, 12,010 (Mar. 1, 1977). In 1977, the mid-point of this range, 60 percent of K, was used to determine whether dolphin stocks in the eastern tropical Pacific Ocean were depleted. 42 Fed. Reg. 64,548 (Dec. 27, 1977). In 1980, NOAA used the 60 percent value in the final rule to govern the taking of marine mammals as bycatch to commercial fishing operations. 45 Fed. Reg. 72,178 (Oct. 31, 1980). More recently, in its 2000 final rule to designate the Cook Inlet stock of beluga whales (*Delphinapterus leucas*) as depleted under the MMPA, NOAA used 60 percent of K as the value to calculate MNPL. 65 Fed. Reg. 34590 (May 31, 2000).

Using the upper and lower range of the values for carrying capacity in Wade and Perryman (2002) and assuming that MNPL = 0.6*K, the MNPL for the Eastern North Pacific stock of gray whales is between 13,044 and 13,566. Hence the OSP for the Eastern North Pacific Stock is a range between 13,044 and 22,610 animals. The most recent abundance estimate (i.e., from the 2001/02 southbound migration season) for the Eastern North Pacific stock of gray whales is 16,848 (CV = 9.49%; 95% log-normal confidence interval = 13,995 to 20,283) (Rugh et al. 2003). Therefore, the Eastern North Pacific gray whale stock is currently above MNPL and is within OSP. Using the abundance estimates reported in Wade and Perryman (2002) and Rugh et al. (2003), the Eastern North Pacific stock of gray whales has been consistently at or above MNPL since the 1979/80 abundance estimate, and it is important to note that during this time period this stock has undergone sustained harvest by, or on behalf of, aboriginal groups. During the late 1990s, the stock probably exceeded the high end of the OSP range.

The IWC has likewise concluded that the ENP stock of gray whales remains a Sustained Management Stock. As indicated in Section III.C. above, the IWC manages whale stocks in relation to their maximum sustained yield level (MSYL), a concept which is analagous to the MMPA concept of MNPL (the difference being that MSYL considers the age and sex structure of the harvest). In 2002, the IWC Scientific Committee conducted a comprehensive assessment of gray whale stocks and concluded that there was essentially zero probability that the Eastern North Pacific stock was below its MSYL (Wade and Perryman 2002; IWC 2003).

As explained in greater detail in Section III.D.3 above, the 1994 amendments to the MMPA adopted the potential biological removal (PBR) approach for evaluating human-caused mortality to marine mammal stocks. The PBR is defined in the Act as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population" 16 U.S.C. § 1362(20). The advantage of managing marine mammals using the PBR approach is that it provides a mechanism for achieving the MMPA goal of managing stocks to reach an OSP level where multi-year population trend data is not available (Wade 1998). A total level of human-caused mortality that is less than the PBR is considered sustainable and consistent with the MMPA's goal of managing marine mammal stocks to achieve their OSP level.

Under 16 U.S.C. § 1362(2), the PBR for a particular marine mammals stock is calculated by taking the product of the following factors: the minimum population of the stock (N_{min}); one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size (R_{max}); and a recovery factor (F_r) between 0.1 and 1.0. This relationship is expressed in Equation 1 below:

$$PBR = N_{min} * 0.5R_{max} * F_r \qquad (1)$$

The "minimum population estimate" refers to an "estimate of the number of animals in a stock that: (A) is based on the best available scientific information on abundance, incorporating the precision and variability associated with such information; and (B) provides reasonable assurance that the stock size is equal to or greater than the estimate" 16 U.S.C. § 1362(27). Wade and Angliss (1997) use the following equation (Equation 2) to calculate N_{min} from an abundance estimate:

$$N_{min} = N/\exp(0.842*[\ln(1+CV(N)^2)]^{½}) \qquad (2)$$

Wade and Angliss (1997) also provide recommendations on choosing the recovery factor, ranging from 0.1 to 1.0, to be used in different scenarios. A recovery factor of 0.1 is to be used as the default recovery factor when a stock is listed as an endangered species under the Endangered Species Act (ESA). A recovery factor of 0.5 should be used for stocks of an unknown status or for stocks that are listed as threatened under the ESA (or as depleted under the MMPA). A recovery factor greater than 0.5, up to and including a value of 1.0, should be used: (1) when the stock is known to be within OSP; (2) the stock has an unknown status, but is increasing; or (3) when a stock is not listed under the ESA and is undergoing removals by aboriginal hunters.

Using the most recent available and corrected abundance estimate for the Eastern North Pacific stock of gray whales from the 2001/02 southbound migration season of 16,848 (CV = 9.49%; 95% log-normal confidence interval = 13,995 to 20,283) (Rugh et al. 2003), and inserting it into Equation 2, the N_{min} is calculated to be 15,557. While 0.04 is the default R_{max} value for cetaceans when there is inadequate information on life history parameters (Wade and Angliss 1997), NOAA's 2003 Stock Assessment Report for gray whales uses an R_{max} value of 0.047 for the Eastern Northern Pacific stock based on the extensive literature published on the stock's population dynamics (Angliss and Lodge 2004). This literature indicates that there is a 90% probability that the true value of R_{max} is greater than 0.047, a value based on the lower 10th percentile of an estimate derived from an age- and sex-structured model (Wade 2002). The proper recovery factor to be used for this stock is 1.0, since the Eastern North Pacific stock of gray whales is not listed under the ESA and has been undergoing a steady or declining level of removals by aboriginal hunters (Wade and Angliss 1997; NMFS 2001; Angliss and Lodge 2004). Inserting the values for N_{min} of 15,557, the R_{max} of 0.047, and the F_r of 1.0 into Equation 1, the PBR for the Eastern North Pacific stock of gray whales is 366. This value is less than, but more current and accurate than, the PBR value of 575 whales reported in NOAA's 2003 Stock Assessment (Angliss and Lodge 2004) which was based on the uncorrected and outdated 1997/98 abundance estimate.

Angliss and Lodge (2004) estimate the annual average human-related mortality and serious injury of Eastern North Pacific gray whales is 107 animals. This annual average accounts for aboriginal harvest (97 gray whales; data from years 1996-2000), incidental bycatch in commercial fisheries (9 gray whales; data from 1990-2000), and ship strikes (1 gray whale; data from 1996-2000). This estimate of human-caused mortality is less than one-third of the calculated PBR for this stock (366 gray whales). Substituting the annual average Russian allocation of the IWC gray whale quota -- an average of 120 whales per year -- for the value of 97 (based on the conservative assumption that the average quota will be harvested each year), the estimated annual average human-related mortality and serious injury would increase to 130 gray whales (120 from aboriginal harvest; 9 from bycatch; 1 from ship strike). This hypothetical estimate of human-caused mortality is roughly one-third of the calculated PBR for this stock (366 whales).

Any additional human-caused mortality resulting from the Tribe's waiver request will be insignificant in relation to the PBR level for the Eastern North Pacific stock. The Tribe's waiver request includes a ceiling of seven strikes per year and 35 strikes over any five year period. Based on the worst case scenario that each whale that is struck but not landed will die (i.e., 0% chance of survival of struck and lost whales), the greatest estimated annual average human-related mortality would increase from 130 to 137 (127 mortalities resulting from harvest; 9 from bycatch; 1 from ship strike), which still provides a buffer of 229 gray whales between the total level of human-caused mortality and the PBR of 366 whales.

It is also important to note that the Scientific Committee of the IWC provided management advice in 2002 that a take of up to 463 whales per year (the lower of the 5^{th} percentiles of Q_1) is sustainable for at least the medium term (~30 years) (IWC 2003). This level of take is over 350 percent higher than the average annual joint US-Russian quota of 124 whales per year as well as a conservative estimate of all human-caused mortality in a given year.

B. Effects on the Pacific Coast Feeding Aggregation.

For the purposes of this request, the PCFA is defined as any Eastern North Pacific gray whale found in the photo-identification database maintained by NOAA's National Marine Mammal Laboratory (NMML) which has been observed south of Alaska from June 1 through November 30 in any year. Although the PCFA is not a separate stock under the MMPA, the Tribe's waiver request is designed to prevent any depletion of whales that exhibit inter-annual site fidelity to the ORSVI gray whale management area and thereby assure that gray whales remain a "significant functioning element" of the local ecosystem. See 16 U.S.C. § 1361(2). The Tribe's waiver request would accomplish this goal by restricting the hunting season to the migration period (December 1 through May 31) and by prohibiting any hunting in the Strait of Juan de Fuca where gray whales are known to feed. Because no hunting of gray whales will be permitted between June 1 and November 30, and the hunt will not occur in the inside waters of the Strait of Juan de Fuca, those whales exhibiting inter-annual site fidelity to the Pacific coast south of Alaska will not be subject to any intentional harvest under the Tribe's request.

By themselves, these time and area restrictions should reduce impacts to levels that will eliminate any significant risk of local depletion. While gray whales that are from the PCFA may be present at certain times between December 1 through May 31 within the Pacific Ocean area of the Makah U&A and therefore might be subject to incidental harvest under the Tribe's waiver request, the proportion of PCFA whales that will be potentially subject to harvest will be significantly diluted by the much larger migrating population. Assuming that whales from the PCFA are randomly intermixed with the overall stock during the entire migration period and throughout the migration corridor, by dividing the most current abundance estimate of the PCFA of 200 whales (for year 2003; Calambokidis et al. 2004) by the most current abundance estimate for the stock of 16,848 (for season 2001/02; Rugh et al. 2003), there is only a 1.19% chance that any gray whale taken in a Makah whale hunt will be part of the PCFA.

Previous survey data suggests that whales from the PCFA are not randomly intermixed with the overall ENP stock during the latter part of spring migration, and that during the month of May as many as 13 percent of gray whales seen off the north Washington coast may be part of the PFCA (Calambokidis et al. 2000). Assuming a "worst case" scenario, if the Tribe strikes seven whales each year and every one of these whales is struck during the month of May, as many as five whales from the PCFA could be killed over a five-year period.

Accordingly, to provide an added margin of safety, the Tribe will take the following steps to ensure that the incidental take of whales from the PFCA will not reduce the number of whales that exhibit site fidelity to the Pacific coast south of Alaska:

First, as soon as practicable after a successful hunt and in consultation with NMML scientists, the Tribe will photograph the left and right flanks of all harvested whales and compare these photos with the NMML photographic catalog to determine if a harvested whale was part of the PCFA. Calambokidis et al. (1994) provide an example of a stranded gray whale successfully matched to a photographic catalog composed of live individuals. The NMML catalog includes all gray whales that have been photographed in surveys conducted south of Alaska from June 1 through November 30 of any year.

Second, the Tribe will cease hunting in a calendar year if, based on this photographic analysis, suspension of the hunt is necessary to prevent the number of whales harvested from the PCFA catalog from exceeding an annual allowable bycatch level (ABL) for that year. The ABL for the PCFA will be calculated by applying the MMPA's potential biological removal (PBR) methodology to a conservative estimate of the number of gray whales seen in more than one year in the Oregon-Southern Vancouver Island (ORSVI) gray whale survey area and is mathematically defined in Equation 3 below:

$$ABL = N_{min}(ORSVI) * 0.5R_{max} * F_r \qquad (3)$$

These additional measures are highly conservative because the incidental harvest of gray whales from the PCFA photographic catalog, which now includes 477 individual whales observed south of Alaska from June 1 through November 30 from 1998-2003 (Calambokidis et al. 2004), is limited by an ABL derived from a much smaller subset of whales – those whales seen in more than one year within the ORSVI gray whale survey area. In addition, application of an ABL on an annual basis provides a further check against local impacts, because the PBR methodology normally permits averaging of human-caused mortality over a three-year time period (Wade and Angliss 1997).

Calambokidis et al. (2004) used an open population model to incorporate several years of photo-identification work from the PCFA to estimate abundance from California to northern Vancouver Island (200 gray whales; CV = 0.103). The authors further divided the overall PCFA abundance estimate to only consider whales that have been seen in previous years to estimate the abundance of whales that may exhibit inter-annual site fidelity to the overall feeding range of the PCFA (176 gray whales; CV = 0.116). The authors also analyzed the abundance of whales that may exhibit inter-annual site fidelity to the ORSVI gray whale management area (150 gray whales; CV = 0.137). This smaller management area was selected based on similar interchange rates between the survey regions and it includes and incorporates all of the Makah U&A. The authors then provide an abundance estimate that only considers whales seen in multiple years within the ORSVI region (122 gray whales; CV = 0.168). As stated in Calambokidis et al. (2004) "…it is both logical and reasonable to use ORSVI as the region for abundance estimation in setting quotas for a harvest of whales from the [Makah U&A] region."

NMFS (2001) used a closed population model, a recovery factor of 0.5 and 1.0, and two abundance estimates (one included observations in California, and the other did not) for the PCFA to calculate a range of PBR estimates for the entire PCFA which ranged from 2.5 to 6.0 animals per year. The reason cited in NMFS (2001) for using a reduced recovery factor when it calculated the lower range for its PBR estimate for the PCFA was to take a conservative approach of treating the feeding aggregation as a separate management unit. Since that time, there have been new research studies released including an open population analysis using survey data collected from multiple years by Calambokidis et al. (2004) and a more recent genetic analysis (Ramakrishnan et al. 2001). Because the PCFA is part of the same ENP stock, the recovery factor should be the same as for the overall ENP stock. Unlike the proposal reviewed in NMFS (2001), the Tribe's current request takes a more conservative approach regarding impacts to the PCFA. The Tribe will not be conducting hunts from June 1 through November 30, thereby eliminating intentional harvest of whales from the PCFA, and the Tribe proposes using an abundance estimate, converted to an N_{min}, based on the number of returning whales to the ORSVI survey area to calculate an ABL to account for incidental harvest of PCFA whales during the migration period.

The applicable annual ABL will be calculated as follows. We use the 2003 abundance estimate that only considers whales seen in more than one year in the area from Oregon to southern Vancouver Island (122), the most conservative abundance estimate provided in Calambokidis et al. (2004), to calculate an N_{min} of 106 (using Equation 2). An R_{max} of 0.047 is used because the best available science shows that the PCFA is part of the Eastern North Pacific stock of gray whales (Swartz et al. 2000; Angliss and Lodge 2004). A recovery factor of 1.0 is used because: (1) the best available science shows that the PCFA is part of the Eastern North Pacific stock of gray whales (Swartz et al. 2000; Angliss and Lodge 2004), a recovered non-listed stock for which Angliss and Lodge (2004) use a recovery factor of 1.0; (2) the abundance estimates are calculated from an open population model which incorporate multiple years of survey effort; (3) the PCFA area south of Alaska for which the abundance estimate is based has been truncated to address local depletion around the Makah U&A (i.e., ORSVI); and (4) the abundance estimate is based only on whales seen in multiple years (i.e., whales potentially showing site fidelity to the region). Using Equation 3 and inserting an N_{min} of 106, an R_{max} of 0.047, and an F_r of 1.0, the resulting applicable annual ABL is calculated to be 2.49.

Under the Tribe's waiver request, the applicable ABL would be recalculated using the above methodology to reflect the most current survey data. The proposed calculation methodology is highly conservative. For comparison, if one used the 2003 abundance estimate for all of the whales seen in the PCFA (200 whales), which would be converted to an N_{min} of 184 whales (using Equation 2), the ABL would be 4.32 (using Equation 3). Nevertheless, the Tribe proposes to apply the ABL for the smaller ORSVI gray whale survey area and any harvested gray whale will be compared with the NMML photographic catalog for the entire PCFA, not just those whales seen in ORSVI.

In short, given the remote chances of harvesting a single PCFA whale (much less the chance of harvesting two) in the Pacific Ocean during the migration time period and the Tribe's commitment to cease hunting for the remainder of the calendar year to prevent an ABL for that year from being exceeded, the Tribe's overall harvest activities will not result in local depletion or prevent the gray whale from remaining a significant functioning element of the Washington coast ecosystem.

C. Effects on individual whales.

1. Lethal Takes.

A maximum of seven whales will be struck in any year. The Tribe is committed to making every effort to land a whale once it has been struck. During the Makah whaling seasons in 1999 and 2000, there were no whales that were struck and lost and in 1999, the one whale that was struck was landed (i.e., 100% efficiency). Efficiency is defined as the number of landed whales divided by the number struck (for the purpose of this discussion, there can be multiple strikes on an individual whale; but no more than seven different whales will be struck in any one calendar year).

The Alaska Eskimo Whaling Commission uses a qualitative assessment of the likelihood of survival of a bowhead whale (*Balaena mysticetus*) that has been struck and lost. Hunters report the chance of survival of struck and lost whales as being: "excellent" or "lived;" "good," "fair," or "probably lived;" "poor" or "probably died;" "died;" or "unknown" (Philo et al. 1993). Accurate accountability of struck and lost whales and assigning survival rates are important in determining IWC quotas and in modeling whale population dynamics (Suydam et al. 1995).

The Tribe's waiver request is based on the highly conservative assumption that all individual whales that are struck and lost will have a 0% chance of survival (in terms of considering the MMPA PBR approach). The Tribe will cease hunting activities when seven strikes occur in a calendar year, or when the take of photo-identified PCFA whales approaches the ABL, whichever comes first. Therefore, for the purposes of evaluating the Tribe's request, no more than seven whales per year could be killed. The Tribe's regulations will limit the number of struck and lost whales to no more than three in any calendar year. Under no circumstances will the Tribe allow a strike on a gray whale calf or a gray whale accompanied by a calf.

The hunt will be monitored by biologists from Makah Fisheries Management and from NOAA Fisheries and the Tribe anticipates a thorough, yet still qualitative, approach to assigning survival rates of struck and lost whales to the IWC and NOAA for the purposes of population modeling. If the Tribe were to have a struck and lost whale, the hunt would be evaluated by the Tribe, and the Tribe would implement any improvements as necessary.

In addition to working to minimize the likelihood of any struck and lost whales, the Tribe will take measures which are designed to provide the most humane hunt practicable consistent with the goal of also providing opportunity for Tribal members to engage in a traditional, culturally appropriate hunt. The MMPA defines "humane" in the context of taking a marine mammal as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved." 16 U.S.C. § 1362(4).

The Tribe proposes to use a toggle-pointed harpoon with line and floats attached to originally secure the whale, followed by shot(s) fired at the central nervous system (CNS) from a high caliber firearm to quickly and efficiently dispatch the whale (Ingling 1997). Any of the .50BMG firearm/ammunition combinations are considered more than adequate to humanely dispatch a gray whale (Ingling 1997). The .50BMG caliber firearm is capable of shooting an Arizona Ammunition solid 570 grain bullet at 3,200 feet/second and generating 13,000 foot-pounds of energy (Ingling 1999). This firearm/cartridge combination can penetrate 240 inches of water, and after using a correction factor, can penetrate the equivalent of 133 inches of flesh. The largest width of a gray whale reported in Perryman and Lynn (2002) was less than 2.8 m (or 110 inches), in which case the .50BMG could create a wound channel completely through the width of the largest gray whale. The flesh covering the portion of the skull housing the brain is under 10 inches thick and the flesh covering the portion of the upper spinal cord is about 18 inches thick on a thirty foot gray whale (Ingling 1997). Considering the overwhelming firepower of a .50BMG caliber firearm, and the size of gray whales, this method is more than adequate to humanely dispatch a gray whale. The gray whale harvested by the Makah Tribe in 1999 expired 8 minutes after the initial harpoon strike (NMFS 2001).

2. Non-Lethal Takes.

In addition to lethal takes of gray whales, the Tribe's waiver request will result in "harassment" of gray whales as defined by the MMPA. The MMPA defines "harassment" to mean any act of pursuit, torment, or annoyance which— (i) has the potential to injure a marine mammal or marine mammal stock in the wild (referred to as Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavorial patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (referred to as Level B harassment). 16 U.S.C. § 1362(18).

Whales that are not killed in the hunt may be subject to "harassment" as a result of approaches and unsuccessful harpooning attempts that do not penetrate the whale's body and hence do not meet the definition of a "strike." Based on experience with whale hunts in 1999 and 2000, the Tribe estimates that there could be approximately 10 approaches and 4 unsuccessful harpoon attempts for every whale struck.

Approaches would be classified as Level B harassment and would be unlikely to result in any increased level of human-caused mortality to individual whales. Gray whales feed, migrate, breed, and calve close to shore, and therefore they encounter humans on vessels throughout their range. There is a major tourism industry that provides opportunities to watch gray whales on the winter breeding grounds in Mexico. Commercial and private whale watching occurs during the migration along the west coast of the United States and Canada. Gray whales encounter commercial fishing vessels in Bristol Bay, and small craft used by Chukotka natives and Alaska natives in the Arctic. Off the coast of Los Angeles, California during the whalewatching season, Rugh et al. (1999) reported that there can be eight to 12 boats following a single whale. The number of approaches incident to Makah whaling will be minor in comparison to these existing sources of harassment. Assuming an average pod size of approximately two animals during the migration period in the Pacific Northwest (Green et al. 1995), the number of whales subject to Level B harassment in a calendar year will not exceed 140.

Unsuccessful harpoon attempts would probably be classified as Level A harassment. However, because the harpoon would not penetrate the body of the whale on the attempt, unsuccessful harpoon attempts would not result in any increase in human-caused mortality. NOAA (2001) concluded, based on their experience with biopsy darting research, that instances where a harpoon did not penetrate the whale would not likely have a significant adverse effect on whale behavior. Clapham and Mattila (1993) assessed behavior of humpback whales (*Megaptera novaeangliae*) in relation to both successful and unsuccessful biopsy attempts. Of the 427 missed biopsy attempts, 87.8% of the time the whales showed no reaction. Missed harpoon strikes would be analogous to missed biopsy attempts, where a projectile lands in the water nearby a whale, but does not cause contact. Clapham and Mattila (1993) reported that of the successfully biopsied whales (n = 565), 66.6% showed no detectable reaction or a low-level reaction (defined as a brief startle or a quick submergence, or both). Because a biopsy indicates a direct hit and therefore removal of a small piece of blubber and skin, for the purposes of assessing adverse effects, a biopsy would cause a more substantial effect than, for instance, a shaft of a harpoon bouncing off a whale. Accordingly, the Tribe does not believe that unsuccessful harpoon attempts (i.e., missed harpoon throws or the situation of a harpoon glancing off the animal) should be accounted for as a source of human-caused mortality for the purposes of applying the PBR methodology. In any event, no more than 28 gray whales will likely be subject to Level A harassment in any calendar year under this request.

D. Factors to be Considered in Prescribing Regulations.

This section provides an analysis of the five factors set out in Section 103(b) of the MMPA, 16 U.S.C. § 1373(b) which the Secretary must consider in prescribing regulations to implement the Tribe's waiver request.

1. Existing and Future Levels of Species and Stocks.

Section 103(b)(1) instructs the Secretary to consider "existing and future levels of marine mammal species and populations stocks." 16 U.S.C. § 1373(b)(1). The critically depleted Western North Pacific stock of gray whales which migrates along the east coast of Asia (Rice and Wolman 1971) will not be affected by this request. As shown above, the Eastern North Pacific stock of gray whales is currently within its OSP range. Even with the level of take proposed in this request, the stock is not likely to diminish below OSP within the foreseeable future. In 2002, the IWC's Scientific Committee estimated that a take of up to 463 whales per year would be sustainable over at least the medium term (~30 years) (IWC 2003). This level of take is substantially higher (by almost 350 percent) than the average annual joint US-Russian quota of 124 whales per year as well as a conservative estimate of all human-caused mortality in a given year. Any regulations promulgated to implement the Tribe's waiver request should provide for reduced strike limits or suspension of the hunt if necessary to prevent the abundance of the Eastern North Pacific stock of gray whales from falling below OSP.

2. Existing International Treaty and Agreement Obligations of the United States.

Section 103(b)(2) directs the Secretary to consider "existing international treaty and agreement obligations of the United States." 16 U.S.C. § 1373(b). The Tribe's request is consistent with current IWC regulations which provide for an aboriginal subsistence quota of 620 gray whales between 2003 and 2007, with a maximum take of 140 gray whales in any one year. By bilateral agreement between the United States and the Russian Federation, up to 20 gray whales may be taken from this quota by the Makah Tribe over the five year period, with a maximum of five whales in any one year. The Tribe's request is also consistent with the IWC's prohibition against the taking of calves and whales accompanied by calves. The number of takes and strikes allowed under this request, as well as the time and manner of harvest, may be subject to reduction if necessary to meet the international treaty obligations of the United States under the International Convention for the Regulation of Whaling (ICRW).

3. The Marine Ecosystem and Related Environmental Considerations.

Section 103(b)(3) requires the Secretary to consider "the marine ecosystem and related environmental considerations." 16 U.S.C. § 1373(b)(3). As discussed above, the Tribe's request is designed to maintain the Eastern North Pacific stock of gray whales at or above an OSP level and to prevent any depletion of the abundance of gray whales along the Pacific coast south of Alaska and within the ORSVI survey area. These measures will ensure that Eastern North Pacific gray whales remain a functioning part of the ecosystem on multiple spatial scales: throughout the migration corridor; the Pacific coast south of Alaska; as well as the local region surrounding the Makah U&A.

In the past, concerns have been raised about the impact of the hunt on seabirds and the safety of the high-powered rifle. The Tribe believes that these concerns are greatly mitigated by its current request which prohibits hunting from June 1 and November 30 and within the Strait of Juan de Fuca. To address further concerns about the impacts of whaling on nesting seabirds, the Tribe proposes a restriction barring any gray whale from being struck within 200 yards of Tatoosh Island or White Rock during the month of May. The Tribe also intends to implement safety measures in their Tribal regulations which are no less protective of public safety than those provided for in its 2001 gray whale management plan (Makah Tribal Council 2001).[11] Further measures to address impacts to other species and public safety may be developed and implemented based on the outcome of the NEPA process.

4. Conservation, Development, and Utilization of Fishery Resources.

Section 103(b)(4) of the Act instructs the Secretary to consider "the conservation, development, and utilization of fishery resources." 16 U.S.C. § 1373(b)(4). No impacts to fisheries, either positive or negative, are expected to occur as a result of the Tribe's request.

5. Economic and Technological Feasibility of Implementation.

[11] These measures authorized the discharge of firearms when whaling only when the shooter was within 30 feet of the target area of the whale and the shooter's field of view was clear of all persons, vessels, and other objects that could result in injury or loss of human life. The measures also set minimum visibility standards for the hunt (Makah Tribal Council 2001).

Section 103(b)(5) of the Act instructs the Secretary to consider "the economic and technological feasibility of implementation." 16 U.S.C. § 1373(b)(5). The Tribe believes that its request will be entirely feasible to implement. The hunting methods called for in its request are not intended to be intensive, but have proven to be effective within the context of the Tribe's goal of providing opportunities for a traditional ceremonial and subsistence whale hunt.

The request should be quite feasible to implement from a management standpoint. The Tribe's waiver request is no more complex than numerous Treaty fisheries that the Tribe has managed in cooperation with NOAA Fisheries and the Washington Department of Fish and Wildlife over the past three decades. With one exception, the proposed management regime is very similar to that which the Tribe successfully implemented in 1999 and 2000. The one major addition is the photographic monitoring of the harvest to ensure that the ABL for the PCFA is not exceeded in any calendar year. The Tribe will have a qualified marine mammal biologist on staff who will administer these provisions in consultation with NMML biologists. In the event that the Tribe is unable or unwilling to effectively implement and enforce Tribal regulations, these requirements will be subject to direct enforcement by NOAA Fisheries enforcement personnel.

VI. Conclusion.

NOAA should approve the Tribe's request for a waiver and adopt regulations that permit the Tribe to exercise its treaty rights in the manner specified in this application. The proposed waiver is necessary for the United States government to fulfill its legal obligations to the Tribe under the Treaty of Neah Bay, will not disadvantage the Eastern North Pacific stock of gray whales, and will be consistent with the purposes and policies of the MMPA.

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VIII. Appendices

Appendix A:

RENKER, A. M. 2002. Whale hunting and the Makah Tribe: A Needs Statement. Report to Intl. Whal. Comm., IWC/54/AS2.

Appendix B:

Treaty of Neah Bay. 1855.

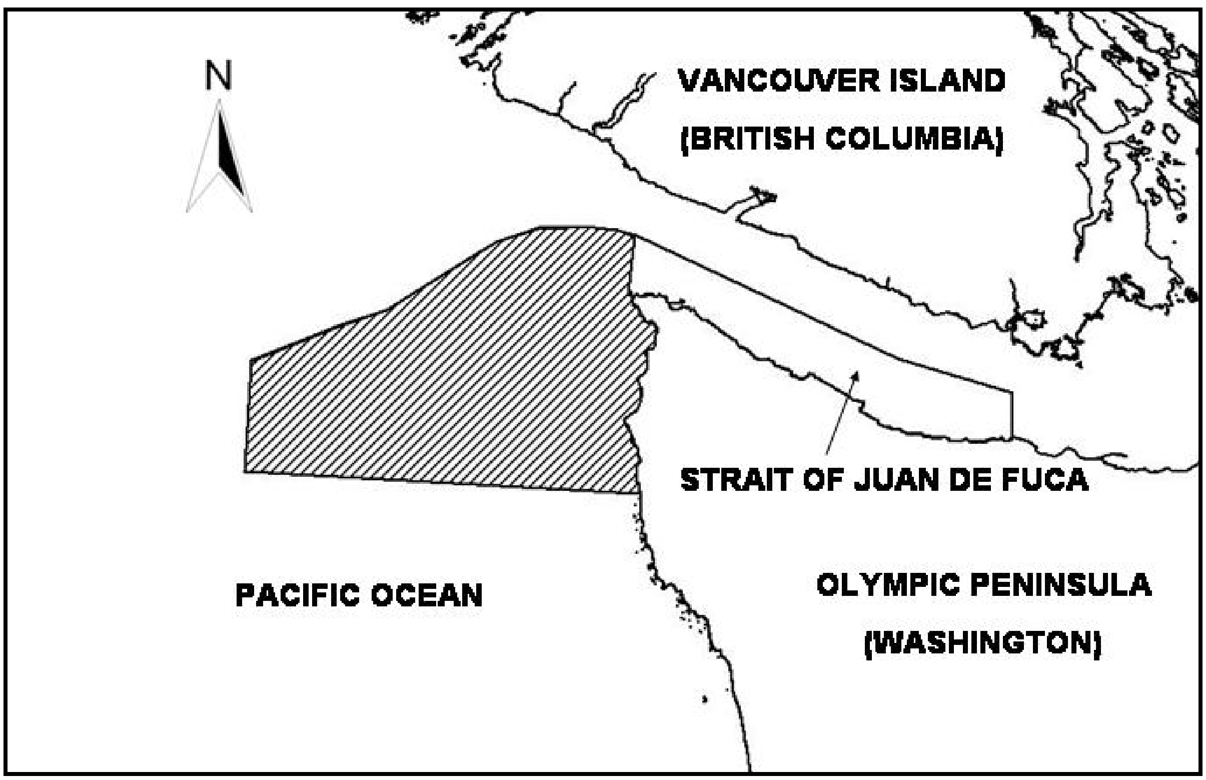

Figure 1. Map of Makah Usual and Accustomed Hunting and Fishing Area (U&A). Eastern North Pacific gray whale harvest by the Makah Tribe would occur in the Pacific Ocean denoted by filled area.

Appendix A

Whale Hunting and the Makah Tribe:
A Needs Statement

Ann M. Renker, Ph.D.
March 2002

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Whale Hunting and the Makah Tribe

I. INTRODUCTION

This document presents information pertinent to the continuation of the Makah subsistence whale hunt, and is presented in two parts: a cultural component and a nutritional component. The Needs Statement demonstrates the following points:

1) Whale hunting for subsistence purposes is an activity Makahs practiced for at least 1,500 years before the present day. Documented use of whale products for subsistence purposes extends another 750 years before this date, since Makahs used drift and stranded whales long before hunting technology developed. Continuation of the restored whale hunt will maintain important subsistence benefits reintroduced to the Makah community in 1999. This benefit increases in importance as the unemployment rate in Washington State increases and as salmon and other Pacific fishing stocks continue to vary in abundance. Increasing variance in international and domestic fishing quotas diminish the reliability of the marine subsistence component of the Makah Tribe, along with the environmental pressures exerted by oil spills, red tides, pollution, and other factors beyond the control of the Tribe. Gray whales are a reliable resource that can offset subsistence pressures from other sources.

2) For 1500 years, whale hunting and its associated components have had important ceremonial and social functions for the Makah community, in addition to the provision of subsistence benefits. The importance of this ceremonial and subsistence practice is demonstrated in the Treaty of Neah Bay, signed in 1855. Makah negotiators insisted that the right to hunt whale be included in the treaty; this right is reserved in Article IV, and is discussed in more depth later in this document.

Elders and anthropologists trace the decline of the social and physical health of the tribe to the elimination of the whale hunt and its associated ceremonial and social rigors. A community survey conducted in 2001 December, demonstrated that an overwhelming majority (93.9%) of the village believes that the resumption of the whale hunt has positively affected the Tribe, and 51.6% specifically cited moral and social changes as the most important benefit. Clearly, the Makah people believe that the restoration of the hunt has contributed to the physical and mental health of the reservation. Continuation of the hunt will maintain this new-found motivation and momentum, and allow the Makah community to redefine and refine ancestral information and values in light of modern times. The revitalization of the hunt has allowed Makahs an additional mechanism to instill the traditional values of the Tribe which help young and old to conquer the vicissitudes of modern life.

3) The Household Whaling Survey (Renker 2002) provides an important tool which provides empirical support for the emotional and psychological benefits mentioned previously. Data indicated that an overwhelming majority of Makah respondents support the Makah whale hunt, and that most reservation households now desire whale products to be a regular part of their diets. For example, 86.5% of survey respondents wanted whale meat in their households on a regular basis, and 72.4% of the survey respondents felt the same way about whale oil. (Survey results are discussed in detail in later sections of this document.) The results of this survey present a good picture of the mainstream opinion of the Makah people.

4) The Makah Tribe has been actively involved in the management and protection of its wealth of resources for millenia. For thousands of years, the Makahs achieved and maintained a functional balance with many land, air, and ocean species, especially the gray and humpback whales. This carefully constructed dynamic was upset during the years of unregulated whale hunting by others on the Pacific Coast. The restored Makah whale hunt has not affected current eastern Pacific gray whale stocks negatively, and is small in comparison to the total aboriginal subsistence harvest. In fact, current figures indicate that the gray whale population continues to maintain numbers that are at historic high levels.

5) The Makah people can now actively demonstrate the continuing existence of their 2,000 year old subsistence culture. The whale had always played an integral part in the subsistence practices of the Makah Tribe, save the brief seventy year period which commenced in the 1920s. While the decimation of the whale herds made it virtually impossible for Makahs to procure the food which traditionally carried the most extraordinary social, cultural, and nutritional benefits, the restored hunt provides modern Makahs with a rich source of traditional foods which are nutritionally superior to many non-indigenous provisions which are available to the community.

The gray whale population now exceeds early historic levels. The Makah subsistence and ceremonial need to take whales should continue to be recognized and respected. Since the Tribe has a conservation record of considerable time depth, a limited subsistence whale hunt will continue to be easily managed. More importantly, another annual quota of five whales will maintain the benefits secured for future generations of Makah people by Treaty negotiators.

The Makah request for five whales is again predicated on the fact that Tribal membership is now composed of the residents of the five traditional Makah villages which were consolidated during the early years of the Reservation. Since Treaty times, the Makah Tribe has always represented itself as a nation which began as five villages. This request honors this tradition, and asks for one whale per village.

In addition, a review of the ethnographic literature finds that the number five, whether an actual figure or an average, appears multiple times in discussions of early historic harvests (Jewitt 1815, Cavanaugh 1983, Huelsbeck 1988). Five whales per year did not create an undue population stress for a healthy gray whale stock in the years prior to 1830, and would not adversely affect the modern, healthy, gray whale population of the eastern Pacific (Environmental Assessment 2001).

METHOD STATEMENT

Interpretation of Makah history, culture, and language is accomplished through the juxtaposition of a variety of sources. By evaluating evidence from Makah archaeological sites (like Ozette),in conjunct with oral histories, linguistic information, ethnographies, and early written records of traders, explorers and agency employees, one generates a cultural profile that simultaneously integrates and cross-references these distinct sources of data.

The primary source of archaeological data substantiating the existence of Makah pre-Treaty whale hunts and offshore fisheries is the Ozette Collection, the largest and most comprehensive collection of pre-contact Makah artifacts in the world. The Ozette village was one of five pre-contact Makah villages which were occupied throughout the year: **di.ya** or Neah Bay; **bi?id?a** or Biheda; **wa?ac'** or Why-atch; **c'u.yas** or Tsoo-yess; and **?use.?i=** or Ozette (Taylor 1974). Unlike the others, Ozette was partially buried by a catastrophic mudslide approximately 400 years ago. A massive archaeological excavation from 1970 - 1981 uncovered 50,000 artifacts that were remarkably well preserved; these artifacts tell the story of the Makah culture as it was prior to contact with non-Indians (Wessen 1982, Huelsbeck 1983).

When interpreting the anthropological literature, a standard procedure relating to the classification of the Makah culture as a member of the Nootkan cultural group was followed. The Makah culture is the only example of a Nootkan culture outside of Canada; all other Nootkan groups reside along the western and southwestern coast of Vancouver Island. Scholars recognize the close relationship between Makah and the other members of the Nootkan cultural category (Curtis 1911, Drucker 1951, Driver 1969, Arima 1990, Renker 1994). It is therefore standard practice to consider sources relating both to the sub-group which is the focus of inquiry (Makah), and nearby closely related sub-groups on Vancouver Island (**nu.ca.nu.=** bands).

For the nutritional component of the Needs Statement, the document utilized the methodology and definitions endorsed by the United Nations University and the International Union of Nutrition Science's Committee on Nutritional Anthropology.

The methodology for the Household Whaling Survey (Renker 2002) is discussed in Appendix 3.

Definitions

Pre-contact refers to the chronological time period prior to 1788. **Historic** refers to the chronological time period from 1788-1933. **Contemporary** refers to the chronological time perioc from 1934 till today.

A Makah elder is an individual who is enrolled in the Makah Tribe, is over 75 years of age, and is a native speaker of the Makah language.

Westcoast refers to the generalized cultural group of Makah, Nitinaht, and Nootkan peoples. **nu.ca.nu.=** refers only to Nitinaht and Nootkan peoples since these people are closely related subgroups who live on Vancouver Island.

Subsistence refers to the anthropological concept that a particular food product or supplement is directly acquired by th people who will use the item for local consumption and nutritional purposes.

Linguistic and Other Conventions

Elements of the Makah language (morphemes, words and the like) are printed in **bold** type to enhance visibility. Because of the limitations affecting the preparation of this opinion, I use a variation of the Makah Alphabet. A key to the adaptation used this document is included in Appendix 1.

Indented citations with quotation marks are taken from oral histories. Indented citations without quotation marks are from written sources.

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II. WHALE HUNTING AND THE MAKAH TRIBE: THE CULTURAL COMPONENT

Cultural Abstract

Anthropologically, the Makah culture is classified within the Nootkan sub-division of Northwest Coast cultures. The Makah people speak a language, **q*i.q*i.diccaq**, which is classified as a member of the Wakashan language family. The Makah Tribe is the only representative of the Nootkan cultural classification and the Wakashan language family in the United States (Renker and Gunther 1990; Renker 1994).

Classic descriptions are exemplified in Swan (1870), Curtis (1911), Waterman (1920), and Densmore (1939); some of the more recent publications include Renker (1994) and Renker and Gunther (1990), which span pre-contact through contemporary times, as well as Parker-Pascua (1991), which concentrates on Makah pre-contact life. Like all cultures termed Northwest Coast cultures by anthropologists, the classification is based upon factors first identified in these cultures as each existed in early historic times. Makah culture exhibits a number of characteristic Northwest Coast traits and trait complexes, including:

1. Emphasis on achieved wealth as measured in property and hereditary rights;

2. Complex patterns of social stratification;

3. A highly developed painting and wood carving style;

4. A material culture based on the abundance of the wood resource in the area, especially when related to the absence of other technologies, such as ceramics; and,

5. A subsistence pattern based on the utilization of available marine, riverine, subtidal and intertidal resources, as well as a predictable supply of anadromous fish.

The factors which further classify the Makah culture within the Nootkan sub-division provide a more detailed list of items which distinguish the Makah culture from other American Northwest Coast cultures. These factors include: a)the integration of rank and kinship as the basis for social interaction (Drucker 1951); b) the integration of land and sea spirits in a ceremonial complex which featured both inclusive and exclusive secret societies and events (Curtis 1911, Sapir 1939, Sapir and Swadesh 1955); c) the development of a highly regulated system of ceremonial and economic privileges, including the ownership of, and control over, tangible and intangible properties such as whaling grounds, fishing grounds, and other sections of ocean and river property (Curtis 1911, Densmore 1939, Drucker 1951); and d) the development of ocean-going technologies like fixed referent navigation and the construction of sea-worthy canoes (Drucker 1951, Renker and Pascua 1989).

These last technologies are prominent components in the most dramatic pursuit of the Makah Tribe: whale hunting. Several Pacific coastal Tribes utilized dead whales which happened to drift onto the shore, or cultivated ritualists who actively used sympathetic magic to entice these drift animals. In contrast, the Makahs and some of their Vancouver Island relatives were famous for their active and aggressive hunt of these large sea mammals (Swan 1870, Waterman 1920, Densmore 1939).

The Whaling Culture of the Makah Tribe

The relationship between Makah people and whales is one of great antiquity. Archaeological data from a recent excavation at the Makah village of Wa-atch indicate that whale bones were present some 3,850+ 75 years b.p. (before present) (Wessen 1994). Food use of drift and stranded whale predated hunting technology. Better known data from the Ozette site demonstrate some 1,500 years of continuous whale use. This practice continued through the period of contact with non-Indians, and persisted into this century. Recorded history provides a variety of dates for the last Makah whale hunt prior to 1999; it probably happened during the latter half of the 1920s (Laut 1928).

Archaeological and ethnohistorical data demonstrate that Makahs hunted a variety of species of whale which traveled through their territory, including the gray (Eschrichtius robustus), humpback (Megaptera novaeangliae), finback (Balaenoptera physalus), and right whales (Eubalaena glacialis). Huelsbeck (1988a:5) discusses the traits which make both gray whales and humpbacks attractive prey. In addition to swimming slowly and near the shore, both types of whales could appear during the summer. Humpbacks have also been known to migrate along the coast, but not to the extent that gray whales do. Non-Indian whale hunters characterize the gray as the more aggressive species of the two during a hunt (Hagelund 1987).

There is no doubt that Makah people hunted whale in pre-contact times, and that the hunt was an important subsistence activity. The Ozette site yielded whale hunting gear and over 3400 whale bones, including whale bones with embedded harpoon shell blades (Huelsbeck 1988a:1).

The archaeological record is supported by ethnographic sources like the Jewitt Narrative, one of the most interesting and important first person accounts generated during the European exploration of the Pacific Northwest Coast. John Jewitt was one of the surviving crew members of the ship Boston, which was ravaged and sunk by the **nu.ca.nu.**= Chief, Maquinna, in Nootka Sound in 1803. Jewitt remained in Maquinna's service as a slave until his rescue in 1805, and recorded his experiences and observations in a diary first published in 1815.

In spite of his ethnocentrism and lack of knowledge of nu.ca.nu.= culture, Jewitt's observations remain a key document in the early historical record of the area. Jewitt describes the enormous amount of time Maquinna and his crew invested in the pursuit of offshore whales in 1804 and 1805. During these years, Maquinna had only one successful hunt.

Cavanaugh (1983) indicates that Maquinna's lack of whale hunting success during the 1804 and 1805 seasons at Nootka Sound was not indicative of the fate of other hunters. While Maquinna secured one whale during Jewitt's captivity, hunters procured an additional four whales. Simple addition indicates that the people of Nootka Sound had the food and product resource of five hunted whales at their disposal.

According to Huelsbeck, calculations produce a scenario based on abundance, rather than paucity. Using a very conservative estimate, the five whales caught at Nootka Sound "would have provided between 16.25 and 37.5 metric tons of blubber, and could have provided a similar amount of meat, depending on whether or not the California gray or the larger humpback whale was taken" (Huelsbeck 1988b:3). This huge quantity of meat and blubber could have provided between 32.5 and 150 kg. of edible whale product per person for a village with a population of 500 individuals (Huelsbeck 1988b:4).

Certainly the number of whales taken by all Makah crews varied from year to year. A minimum of 67 whales were "represented by the bones recovered from the late prehistoric level" at Ozette (Huelsbeck 1988a:7), constituting a huge quantity of food products and raw material. Based on historic documents, Huelsbeck estimates that whalers of the Yuquot band, a nu.ca.nu.= group, "would have averaged 5 whales per year" (1988:157). Densmore reports a much higher success rate for historic Makah whale hunters. "In old times the average catch for a whaler was one or two whales a year, but a man often caught four and occasionally five in a season" (1939:63). Wilcox (1895:20) provides a more conservative appraisal of the Makah whale hunt for the years 1889-1892. His figures indicate that the Makah Tribe averaged 5.5 whales per year (as cited in Huelsbeck 1988:152) at a time when the cetacean population had already been severely impacted by other, non-Makah whaling interests.

Makah whale hunting capitalized on the annual northerly migration of the gray whale, and the availability of the humpback in their waters. Archeological data corroborate Makah oral history in this regard. In the Ozette Collection, 50.51% of the whale bones identifiable by species were that of the gray, while another 46.51% came from the humpback (Huelsbeck 1988a:4). The remainder of the sample contained finback, right, sperm and killer whales. Huelsbeck interprets the archaeological and ethnohistorical data to indicate that the finback and right whales were hunted from time to time, while the sperm and killer whales "probably represent drift whales" (1988a:6), although some Makah families have oral traditions which involve hunting these species.

The impressive gray whale migration approximately occurs from March to May, and provided a predictable resource that could be harvested by eight man whaling crews which set forth in large cedar canoes. In one hunting strategy, lookouts stationed at strategic points could see a whale and alert the proper individuals, providing enough opportunity for canoes at the ready to launch and chase the whales. (This type of whale hunt, termed an offshore hunt in Hagelund (1987) and Webb (1988), would be adopted by the non-Indian whaling interests in the area centuries later.)

Whale hunts were not restricted to this northerly migration, however. Densmore (1939:49) reports that Makahs distinguished spring whale meat from winter whale meat:

> The whales that "run in the spring" and were known as "spring whales" were said to have red meat because they ate clams and other shellfish they scooped off the rocks. The "winter whale" was considered the best and had a layer of white fat on the outside and red meat underneath.

Whatever the season, the whale hunt tested the training and stamina of the entire crew. A lucky crew might take a whale within a few miles of shore, while some hunts found Makah crews towed thirty or more miles out to sea by an injured whale. Whale hunters told Densmore that

> A wounded whale usually towed the canoe by means of the harpoon rope, held by the men, its speed depending on the severity of its wound. Sometimes the whale went so fast that the end of the canoe went down in the waves. This towing of the canoe might continue for three or four days, the whalers waiting until the whale became sufficiently weary to be dispatched (1939:52).

These great sea mammal hunts (Swan 1870, Waterman 1920), as well as interceptive and deep water fisheries, would not have been possible without a highly developed system of fixed referent navigation, and a keen understanding of the prevailing winds and weather patterns in Makah marine territory. (One appreciates Makah navigational skills more thoroughly when one considers that Captain Cook failed to "discover" the opening of the Strait of Juan de Fuca because of the thick fog.)

An example of the Makah fixed referent system was provided by a Makah elder who has been fishing since the 1920s.

> "There's a ridge on Vancouver Island, I think the main peak there is behind Carmanah Light, and that's Carmanah mountain. That's the highest one, and there's a ridge behind that as you venture to the west, one peak will show up behind that as you venture to the west, one peak will show up behind that high peak on the ridge. The first one is **c'akwaqabas**, the second one is **?a7qabas**, and then you have a low kind of ridge, it drops down for quite a ways, and then another peak shows up, and that's in...oh...mostly used for sealing grounds, called The Spit. Now I have electronic navigational equipment, and I look upon those landmarks to determine just where we actually were when we were one peak out, two peaks out, or seven peaks out."

When navigating out of sight of land, Makah seafarers relied on the prevailing winds and currents, as well as the shape of the waves and behavior of seabirds. For example, prevailing winds in the early morning are mostly easterly, and their afternoon counterparts are mostly westerly. Makah canoes ventured out of the sight of land knowing that attention to wind, wave, and fauna would return the vessels to land.

Makah ocean voyagers also understood that these navigational techniques could lead them directly to prime off-shore fishing and whaling areas. In the words of an experienced Makah fisherman,

> "Prevailing currents, can predict them. They run on schedule. They tell direction and duration...Once off shore, the current changes every six hours: north to south, then south to west, then west to north, then north to east. A massive current moves all the time. Currents are predictable and steady...able to predict spawning areas."

Great cedar canoes provided the means for Makah seafarers to travel these great distances offshore. Fisherman, sealers, and whale hunters each used a different type of canoe which varied in size. The whaling canoe was approximately 36 feet long (Pascua 1991) and five or more feet wide (Arima 1983:35). Carvers fashioned these vessels from a single cedar log, providing canoes that "deserve the very highest place for staunch seaworthiness, coupled with great manageableness (sic) and speed" (Waterman 1920:9).

A whaling crew consisted of a chief, or the whaler, and seven men. The whaler owned the canoe and the whaling equipment, and acted as the sole harpooner in the whaling canoe. He also owned important ceremonial privileges acquired through his hereditary status and his ability to interact with the natural and the supernatural to assure a successful hunt.

Other crew members included a steersman, a man responsible for managing the lines and buoys, numerous paddlers, and a man who had a unique responsibility once the hunt was over and the whale was dead. This crew member, a diver, fastened the whale's mouth shut with a length of rope. In addition to sealing in gases which kept the whale afloat, fastening the mouth prevented water from filling the carcass and sinking it (Curtis 1911; Waterman 1920; Pascua 1991).

Whaling was restricted to the men who could physically and mentally withstand the rigors of intensive ritualized training, possessed the hereditary access to the position and its ritualized knowledge, and/or a underwent a supernatural encounter which engendered the gift of whaling ability (Waterman 1920:38-40, Gunther 1942, Drucker 1951:169-170).

All crew members underwent rigorous ceremonial and spiritual preparations prior to beginning a hunt; the success of the hunt depended as much on the observance of ritual as the strength and talent of the hunters (Sapir 1939:114).

> From the white point of view, the matter of greatest concern would be the arrangement of the tackle within the boat, and the methods of approaching and striking the quarry. From the Indian standpoint, however, the really important matter is the proper observance before and during the hunt of the various ceremonial performances for procuring help from the spirits. (Waterman 1920:38)

Curtis (1911) provides the most detailed accounts of rituals whalers used to prepare themselves for the hunt.

> Prayers and numerous songs form a part of every whaler's ritual. The secrets of the profession are handed down from father to son. As soon as the boy is old enough to comprehend such matters and to remember his father's words, he is permitted to accompany the whaling crew on short expeditions. Now also begins his instruction concerning the most propitious spots for ceremonial bathing-places in lakes and rivers considered the most dangerous. At the age of twelve he is taken at night and shown how to bathe and to rub his body with hemlock twigs so as to remove the human taint and render the body acceptable to the whale spirit which is being supplicated. Thereafter he bathes alone at intervals, while

> his instruction in prayers and songs continues until the father deems it proper to retire in the young man's favor (16).

These ceremonial rigors extended to the wives and relatives of the whaling crew, the chief's wife in particular. "Therefore, the whaler and his wife observe a long and exacting course of purification, which includes sexual continence and morning and evening baths at frequent intervals from October until the end of the whaling season...about the end of June" (Curtis 1911:16). This woman was expected to observe a strict set of behaviors while the crew was hunting on the ocean, or else cause havoc with the crew at sea. For example, the whaler's wife was required to lie still and utterly motionless the entire time the crew was hunting on the ocean. Lack of attention to this and other proscribed behaviors could also result in the capture of a whale that was not fat or large enough, or cause the harpooned whale to run out to sea instead of in toward the shore (Gunther 1942).

Physical equipment was also important to the pursuit of the whale. Makah whaling equipment consisted of, but was not limited to: harpoons, sealskin floats, fathoms of line made from whale sinew, fathoms of line made from cedar, and a variety of knives (Curtis 1911:16). Detailed discussions of the equipment and its use are found in Swan (1870) and Waterman (1920). Makah archaeological excavations, most notably Ozette, produced assemblages of this equipment, some of which are now on display at the Makah Tribe's museum and cultural center.

There is an amazing continuity which surrounds Makah whale hunting gear. Pre-contact whale hunting equipment found at Ozette is essentially equivalent to whale hunting gear used by Makahs during the middle and late historic period. This amazing continuity does not exclude innovation. Makah whale hunters appreciated innovation and the opportunity to improve the hunt. By the turn of this century, Wilson Parker, the Makah Whaler of Curtis' photo fame, used a metal Lewis Toggle Hook Harpoon Head on the end of his traditional yew wood harpoon, for example. Another innovation helped to cut the tedious and tiring job of endless paddling: whaling canoes accepted tows from steamers to and from the whaling grounds when the technology became available.

The Makahs hunted the variety of whales which swam in their traditional ocean areas, but favored the predictable gray whale. Descriptions of the hunt itself are available in Swan (1870), Curtis (1911), Waterman (1920), Drucker (1951), Arima (1983) and Pascua (1991).

> It would take a long time to get close to the whale while it was on the surface. Eventually, the crew brought the canoe alongside approaching on the left side and from the rear where the whale could not

> see them. The right time to harpoon was when the whale was just submerging, with its flukes well under and swung towards the canoe so that the animal would swing away in reaction and not smash the canoe (Chief Jones, personal communication). The steersman watched to see the flukes were in the right position and gave the signal to the harpooner who immediately drove the harpoon in behind the fore flipper. At once the canoe was swung sharply to the left away from the whale, and the first float was thrown out by the first right-handed paddler behind the harpooner who quickly crouched in the bow to avoid the line paying out. The next paddler back held his paddle under the line to have it run out smoothly from the space before him. The dangerous moments lasted until all the line and floats were all out because someone could get caught in a loop or the canoe could be capsized or smashed in the first violent struggles of the whale before it sounded. Any disaster that happened was thought due to the incorrect observation of tabus or performance of rituals (Arima 1983:41).

Once the first harpoon had been driven into the whale and the first set of floats were secured, a long lance was used to "attack the whale, making it bleed profusely" (Densmore 1939:50). Makah whalers told Densmore that the process of killing a whale, from first harpoon to final dispatch, could take "three to four days" (1939:52).

The successful whaler and his crew now had to tow the enormous animal and navigate their precious whale back to land, a process which could take two days (Densmore 1939:52). Unfortunately, the long delay in landing the animal could allow putrefaction to begin, thus causing the loss of the meat. The blubber would not be adversely affected by this long journey back to the beach.

Ideally, the whaler wanted to land his prize on his own beach at his own village. Using the tide to help him, the whaler beached the carcass at high tide, "to get the bones of all his whales in one spot" (Arima 1983:43). If a whaler had to beach his catch on another whaler's beach, payments had to be made; these often consisted of portions of the whale.

As the whale was staked and readied to be butchered, the community gathered for this event. Strict protocol governed the butchering process, specifying which portions of the whale were to be cut in sequence. Some regulations identified the pieces of the whale which had to be decorated and ceremonially treated. Others specified which portions were distributed to crew members and other village inhabitants. "Then pieces were given to the rest of the Tribe in order of rank, a procedure which was always carefully observed" (Arima 1983: 43). In effect, the distribution of the whale reinforced the infrastructure of Makah society each time the process occurred.

The highly stratified nature of the Makah social system was a mirror of the status and structure involved in the entire process of the whale hunt. From ceremonial preparation, to the hunt itself, to the ultimate acts of butchering and distribution, Makah whaling actualized the social organization of Makah society. The man who acted as the harpooner for a crew was the chief, or headman, of a particular social group, usually the residents of a single longhouse. He owned the longhouse, the whaling canoe and the equipment. This man also retained the largest burden of ceremonial preparation. These two factors, a large degree of physical wealth and a close relationship with the supernatural, translated into power for the whalers in everyday life.

Whalers, or headmen, were ranked at the top of the pyramid of social standing which existed within a single longhouse. Each resident was affiliated with the headman in some way; this affiliation became the basis for ranking each individual within a residence group. Whaling generated a base from which these relationships were constantly renewed and reinforced. A successful headman could offer prestige, protection and resources to the kin and non-kin residents of his longhouse. A headman who experienced consistent failure, ostensibley because of poor preparation and ineffective supernatural connections, could lose status within his household, and lose non-kin residents as a result. The loss of these residents often translated into a loss of physical wealth and social prestige for a headman.

The anthropological literature tends to concentrate on the role of high-status men in the whale hunt. Makah oral history and articles like Gunther (1942) demonstrate that women played an important social, ceremonial and practical role in the whale hunt complex. Men, for example, were not the only ones affected by relationship between the whale hunt and social status. The women who married whalers dominated the top of the female analog to the male status pyramid. These women, like their male counterparts, found their lives governed by the concept of primogeniture. While whalers tended to be the oldest son of the oldest son of a whaler, the whaler's wife tended to be the oldest daughter of an oldest daughter of a whale hunter. Matches between the oldest son of one whaler and the oldest daughter of another were the ultimate social goal of whaling families. These alliances united two powerful, wealthy families, and insured that consolidated social, ceremonial, and political power would be transmitted to another privileged generation; this procedure is common to historical and contemporary royal families.

Oral history and anthropological documents attest to the fact that the Makah whale hunt generated a series of criteria which governed social processes like status assignations, marriage preferences, and ceremonial displays. The community-at-large played an important role in the success of the whale hunt, even though its role is far less visible in the written record. While anthropologists were most interested in the ceremonial, social and work activities of the privileged classes, it was the support labor that processed, preserved, and prepared the whale products, as well as conducted the trade activities. People of extraordinary talent in any of these activities were recognized and recompensed by those of higher social status. These people of talent, when combined with a high status chief, resulted in a longhouse with a reputation for great things.

Therefore, whale hunting provided more than a means of organizing social groups within a longhouse; the whale hunt also provided a mechanism by which longhouses in a single village related to each other. Accumulated ceremonial and economic wealth often provided a means to rank the whalers, or headman, vis a vis each other. This ranked order precipitated to the residents of each longhouse. In effect, whaling generated a social dynamic which ranked all Makah individuals within a residence group, a longhouse. The practice also generated a social dynamic which ranked all Makah individuals in relation to the inhabitants of all other longhouses. Whaling was the warp and the woof of Makah society.

In addition to providing the whalers with ceremonial privileges, and Makah society with a governing principle and a means to subsistence security, the Makah populace received other benefits from whale hunts. These benefits included, but were not limited to the following:

1. Whale products such as blubber and oil proved an important source of trade goods. The Makahs served as the middlemen in a huge trade network. Because of their geographical advantage, Makahs operated a critical position in a network which functioned north and south along the Pacific Coast, as well as from the Pacific Coast to the Puget Sound (Swan 1870, Renker and Gunther 1990, Renker 1994). Whale products insured that the Makah people enjoyed a high standard of living with diversified interests (Huelsbeck 1988).

2. Whale products provided a substantial food resource for the Makah people. Early archaeological studies indicate that as much as 84.6% of the Makah pre-contact diet could have been composed of whale meat, oil and other food products (Huelsbeck 1983:43). Recent collaborative efforts between Dr. Huelsbeck and marine biologists have resulted in an adjustment to this early statistic. The projected size of the gray whales found at the Ozette site was too conservative; the mammals could easily have provided 100% of the food for the Makah Tribe (Huelsbeck 1995: personal communication). Clearly, whale products fulfilled important subsistence functions. In addition to nutrition, 25% of bone tools found at Ozette were made from whale bone.

3. The skills needed to hunt whales on the open ocean easily

transferred to Makah offshore activities, including deep water and interceptive fisheries and seal hunting. These pursuits provided additional sources of trade items and food.

4. Ceremonies needed to prepare whalers and their respective families for the hunt provided the Makah culture with a social framework that contributed to governmental, social, and spiritual stability.

The four cultural points articulated here have corollaries in the modern world. In relation to trade, the Makah Tribe signed an agreement with the United States Government which restricted the sale of whale products which were generated from whales harvested under the IWC quota. This agreement does not restrict Makahs from utilizing the subsistence-based redistribution networks that already existed within the reservation. Data clearly indicate the presence of localized networks that aid in the redistribution of whale products, particularly to family members who were not adept at processing and preparing whale themselves (Renker 1988, Aradanas 2001, Renker 2002).

Whale products have become a significant food resource for modern Makahs, in spite of the fact that only one whale has so far been successfully hunted during the first IWC quota period. In fact, a drift whale which washed ashore in an isolated part of Makah territory, was butchered and distributed to over 100 Makah households during the summer of 2001. This event is significant because the increasing Makah demand for whale products motivated more Makahs to utilize the drift whale, and return the meat, blubber, bone, and other parts to Neah Bay by boat. Since the whale was located on a remote beach with no road access, a small fleet of boats ferried whale parts from the beach to the boats, then back to Makah households.

Makahs are utilizing whale food products such as meat, blubber, and blubber rendered into oil, as well as other whale parts not as well known to non-Makahs: eyes, brain, heart, cheeks (the Makah reference to the jaw muscles and the fleshy area under the eyes), and the like. Modern Makahs have quickly rediscovered their ancestral appetite for whale products: 72.4% of surveyed households would like whale oil on a regular basis, 86.5% would like whale meat on a regular basis, and 55.8% would like blubber on a regular basis. Numerous survey respondents indicate a preference for sea mammal products for both traditional and health reasons (Renker 2002).

The significance of the whale as a food resource is also apparent when examining the variety of preparation methods in use on the Makah reservation. One might expect a paucity of recipes and techniques for preparing whale meat and blubber, given a seventy year gap in actuality. Instead, respondents provide the following data. Of the 61.3% of the respondents who received whale meat from the 1999 whale, 41.5% made jerky, 43.9% ate roasts, 41.5% cooked stew, 35.4% grilled steaks, and 34.1% smoked meat. 19.5% of respondents also indicated a preparation methods other than those offered by the survey. These innovative methods included stir frying, kippering, deep frying, barbecuing, and boiling. Two respondents made whale burgers, and one created whale sausage. Of the remaining respondents who did not receive whale meat for their personal consumption, 84.7% indicated that they would have liked meat from the 1999 whale.

Of the 75.3% of respondents who prepared blubber, 22.4% smoked it, 37.9% rendered the blubber into oil, 6.9% pickled it, 48.3% boiled it, and 65.5% ate the blubber raw. An additional 3.4% of respondents used the blubber for cosmetic purposes. Several interview respondents did indicate that rendering the blubber from the 1999 whale posed problems because of a low concentration of fat in the animal (Renker 2002).

Whale oil is a particularly important commodity for the Makah people, and its precious nature increases its value. The rich oil is used the way many people use olive oil. In the Makah example, many people flavor dried or plain food, such as fish, fish eggs, potatoes, or bread, by dipping these foods into the whale oil. This use is a traditional one, and is mentioned in the earliest ethnographies, such as Swan (1869) and Densmore (1939). In addition, whale oil may be used in particular ceremonial and ritual activities. In one example, when thrown onto a roaring fire in the middle of a longhouse, the whale oil causes the fire to blaze up in a most extraordinary manner; this effect looks the same to modern Makahs as it did to their ancestors, increasing the spiritual connection between past and present.

The Household Whaling Survey attests to the significance of the whale as a food resource because of the large number of respondents who want additional information about processing and preparation techniques for whale products. Of 163 respondents, 70.6% wanted more information about preparing whale meat, 52.1% wanted to know more about butchering whale, 60.1% wanted information about rendering oil, and 59.5% wanted to know about smoking meat.

Modern Makahs also have an interest in whale bone as a raw material. 75.5% of Makah households report that they would like to have access to whale bone on a regular basis, and some people were disappointed that the bones of the 1999 whale were not made available to the community for private use. Instead, the Makah Tribal Council made an arrangement with the Neah Bay High School which provided vocational opportunities for high school students. The entire skeleton of the 1999 whale was given to the high school so that students would learn to clean and prepare the bones for reassembly and eventual display at the Makah Cultural and Research Center. The National Marine Fisheries Service, The Burke Museum, and the Denver Museum of Natural History are all additional participants in this ongoing project (Monette: personal communication: 2002). To date, some 40 Makah high school students have learned valuable vocational skills through the skeletal assembly project. Faunal assembly skills are in demand in museums and laboratories throughout the United States.

Most importantly, contemporary Makahs insist on the ceremonial rigor and discipline that was so important to their ancestors. 38.7% of respondents in the Household Whaling Survey report that they have actively participated in whaling ceremonial practices since the 1999 whale was harvested, and that 21.6% of their household members are also active ceremonial participants. These figures are meaningful, given the seventy year hiatus in whale hunting, as well as the secretive atmosphere which surrounds these activities. The serious attention given to the ceremonial preparation requirements also acts as an indicator of the positive impact that the whale hunt has had on the social and behavioral aspects of Makah life (Renker 2002).

For example, early ethnographies (Swan 1869, Densmore 1939) as well as recent depictions of pre-contact life (Parker-Pascua 1991) mention the practice followed by whalers' wives of "laying still" with their backs to the ocean while their husbands were hunting whale. By following this practice, wives would spiritually connect with the whale in the ocean, causing it to "be still" on the water, and to swim toward, rather than away, from shore. In the successful 1999 hunt, wives, partners, and mothers of the crew followed this ceremonial practice, and two of these women were brought onto Front Beach in the ritual manner when the whale was brought ashore. Men do practice ceremonial preparations like bathing, but as in pre-contact and historic times, their exact activities are kept highly secret.

A Diachronic Account of Makah Whaling

The Ozette archaeological literature, especially the work of Huelsbeck (1983, 1988, 1988a, 1988b), attests to the considerable time depth and continuity of the Makah whale hunt. Prior to contact with non-Indians, the Makahs and their **nu.ca.nu.**= relatives hunted whale successfully for at least 1200 years without destroying the resource. Ceremonial, social and cultural proscriptions established a functional balance between the Makahs and the whale populations which swam in or through Makah waters.

Once non-Indian traders and explorers entered the waters of the Pacific Northwest, Makah whale hunters felt the effects of an increasing demand for whale products. In response, Makahs continued to ply their well established trade in whale oil and whale products with the visitors.

The regularity and size of the gray whale migration attracted whalers from the United States and Europe. Like the Makahs, other non-Indian whale hunters appreciated the opportunity to practice offshore whaling in the area, as opposed to the more expensive, more protracted, multi-year ocean voyages. "As the market for whale oil and dogfish oil increased in the 1840s and 1850s, the Makah brought oil for sale...Oil purchased from the Indians was a major export of the Hudson's Bay Company" (Lane

1955:17). By 1852, Makahs were trading or selling some 20,000 gallons of whale and fish oil (Lane 1955:18); this figure would rise to 30,000 gallons per annum within 20 years (Gibbs 1877:175).

In 1854, Capt. Charles M. Scammon discovered the breeding grounds of the gray whale in the lagoons of Baja California and Mexico (Hagelund 1987:42-43); this discovery now provided the two terminal points for the gray whale trek, and helped to increase the exploitation of the gray whale on the American Pacific coast.

As time passed and contact with non-Indians increased, other entities intruded into Makah life, and by extension, into the whale hunting complex. Governor Stevens, assigned by the United States' government to negotiate a Treaty with the Makah in 1855, knew of the commercial value of Makah whale hunting talents when the Treaty of Neah Bay was signed. Indeed, numerous Makahs made speeches during the Treaty negotiations asking that the right to whale be reserved to them when the Treaty was signed. These Makah negotiators, and Gov. Stevens, agreed that Article IV. of the Treaty of Neah Bay would specifically list whaling, along with sealing and taking fish, as a right guaranteed to the Makah Tribe. Article IV. of the Treaty of Neah Bay makes Makahs unique among all United States' native tribes: Makahs are the only tribe whose right to hunt whales is recognized in a treaty with the government of the United States.

While the Treaty of Neah Bay preserved the Makah right to hunt whales and seals, and to fish in usual and accustomed grounds, other federal interactions with the Makah did not seem to support this language in actuality. Assistance sent to the Makahs contained agricultural tools, rather than items which supported any of the active components of the Makahs' maritime lifestyle. Instead of tools and materials which would help to procure, process or preserve whale, seal or fish products, Makahs received pitchforks, scythes, hoes, and sickles. "James Swan reported in 1862 that the Makahs had converted the tines of pitchforks into fishhooks, scythes into blubber knives, and sickles into arrowheads" (Marr 1987:29). The Makah reaction to the agricultural materials is perfectly understandable given their splendid maritime talents and the fact that Makah land was obviously unsuited to cultivation (Whitner 1977, Renker and Gunther 1990).

Rather, the motives of the United States are suspect. While soil studies may have been unsophisticated in the mid-nineteenth century in the Pacific Northwest, it took little effort to realize that the soil, vegetation, and topography of the coastal area was unlike the rich agricultural belts in other parts of the country, such as the Plains and the Northeast. Indeed, the land on the Makah reservation was clearly different from that of the Washington territory east of the Cascade Mountains.

This bizarre situation developed because of prevailing ideas regarding federal Indian policy; it had been developed with a very different perspective. The United States government did not want to encourage self-sufficiency, because self-sufficiency often encouraged hunters and gatherers to travel beyond the confines of the established reservations, and to maintain cultural practices considered savage and barbarous. The best way to force a sedentary existence on a group of hunters and gatherers was to make the group dependent upon agriculture, which required a fixed resource base. The singular nature of this policy was also inappropriate for the Makahs, who already had a fixed, plentiful marine resource base and no land suitable for agriculture.

A philosophical mandate accompanied this strategy. "One of the convictions of those associated with the administration of Indian affairs, both officially and informally, was that farming was associated with civilization" (Whitner 1977:21). In the Makah case, Indian policy was designed "to change the Makahs from self-sufficient food gatherers to farmers, dependent on the white people for tools and instruction" (Marr 1987:29). Indian policy was also designed to assimilate Makah people through an educational system that ignored Makah priorities and prohibited the use of the language, in addition to eradicating customs considered heathen, savage, and dangerous (Colson 1953, Gillis 1974, Whitner 1977, Renker and Gunther 1990).

Whitner (1977) reports that Indian Agency personnel were somewhat daunted by the task of civilizing the Makahs, and cites Henry A Webster, the first resident Indian agent, as writing in 1866, "The Makah are probably nearer the normal state of savage wilderness than any other tribe in the Territory, and seem particularly averse to acquiring the habits and customs of the whites" (in Whitner 1977:20). Little progress is recorded in Webster's Annual Report for 1867, though he is staunch in his resolve to eradicate traditional values and practices:

> Their very natures must, however, be changed, and their habits forced, if necessary upon them, or they will retrograde into worse than savage supremacy of filth and disease of former days (ARCIA 1867).

In spite of the Treaty's recognition of whale hunting as an important facet of Makah life, the United States government chose not to support this well-developed practice. Lane (1974) discusses the frustration of several resident Indian agents who realized that federal efforts should be promoting marine activities, rather than agriculture. Some agents believed that assimilating Makahs to American values, customs, and practices would be easier if the government aided traditional marine pursuits.

Lane documents numerous requests for support of fishing activities from 1860-1881 from agents and superintendents. Regardless of the nature of these requests, Lane concludes that "the United States failed to provide the assistance repeatedly requested" (1974:20). Gillis (1974), Lane (1974), Whitner (1977), and Marr (1987) discuss the circumstances surrounding the federal government's promotion of a shift in Makah subsistence from a maritime base to an agricultural one.

In 1870, President Grant's annual message announced an Indian policy which sought to "Christianize and civilize the Indian" (Whitner 1977:18). At this same time, Pacific whale populations were diminishing, and the Makahs who continued to whale hunt had to make adjustments. Singh (1956) and Van Arsdell (1987) indicate that Makahs increased their seal hunting efforts to compensate for a less profitable whale hunt. "Beginning in 1886, Makah crews were hired on sloops and schooners to hunt fur seal off the Washington coast and Vancouver Island (Marr 1987:29). Makah fur seal hunters easily demonstrated their pelagic talents and Makahs quickly used financial profits and exceptional skill to their advantage. Colson (1953:159) reports that "several Makah sealers had their own schooners and were hiring White navigators in the 1890s".

These changes greatly affected traditional subsistence and trading practices. Swan (1884-1887, 2:396) and Waterman (1920:48) both express opinions that the success of Makah fur sealing had an impact on the whale hunt. "This work was so profitable that the Makah temporarily abandoned whale hunting" (Renker and Gunther 1990: 428). Other historians agree. "By 1891, sealing became so lucrative for the Makah and Westcoast native hunters that their traditional whaling expeditions virtually ceased" (Webb 1988:145). A friend of A.W. Smith lamented the decline of the whaling culture in a letter written on 29 November 1888, "Many of our old whalers at Neah Bay have died since we left" (AW Smith Papers).

While the Makah enjoyed the prosperity brought on by their pelagic success, the Pacific fur seal population was showing signs of stress by 1890. The population could not sustain itself in the face of an increasing number of sealers and the use of firearms. The Law of December 30, 1897, made fur sealing illegal; the agent for the Neah Bay agency, Samuel Morse, was directed to enforce this law on the Makah reservation (AW Smith Papers). Accordingly, Makahs would now be allowed to hunt fur seal only from canoes, using traditional gear and techniques. "Some returned to traditional whaling" (Renker and Gunther 1990:428), but the loss of cash from the commercial fur seal hunt created a huge vacuum on the reservation.

While whale hunts were "still the symbolic heart of the culture" (Marr 1987:25), they continued to diminish in frequency, and became less and less cost-effective. In addition, the introduction of American values worked against the traditional subsistence pursuit. For example, the American philosophy of social equality made it difficult for Makahs to continue to staff and organize whaling canoes, and therefore households, according to the ancestral patterns. Whale hunting was no longer the sole avenue to a position of ceremonial and political importance as the headman of a large longhouse.

Epidemics, bans on ceremonial activities, and the federal schooling system also produced devastating effects on the Makah's ability to resume whale hunting after the fur sealing ban. The diseases that affected the Makah population had reduced the number of tribal members by some 75% by 1890 (Boyd 1990:145); much family-owned information was lost as a result. Makahs died without passing down important knowledge. Hancock describes the rapid and disastrous effects of the smallpox epidemic of 1853 in his journal. This epidemic was so severe, it literally wiped the village of **bi?id?a** from the face of the earth.

> It was truly shocking to witness the ravages of this disease here at Neaah (sic) Bay... In a few weeks from the introduction of the disease, hundreds of natives became victims to it, the beach for a distance of eight miles was literally strewn with the dead bodies of these people, presenting a most disgusting spectacle (182).

The extreme number of fatalities caused by the epidemics also disrupted the line of authority in most families. Cultural protocol dictated that ownership of ceremonial and economic rights and privileges had to be transmitted publicly at a potlatch. In many cases, epidemics took the lives of people who had not transmitted control over ceremonial and economic privileges to another person. In many other cases, knowledge of critical components of rituals and ceremonies was abruptly lost. The complicated social structure and ritual life which had existed prior to contact was severely disrupted by the decimation of the Makah population.

The governmental ban on traditional and ceremonial activities added to the social and cultural disruption. Potlatches were illegal by the 1870s (Marr 1987:50), forcing Makahs to move off the reservation or to inaccessible places to hold these important public events. Daniel Dorchester, Superintendent of the Indian Service wrote the following about Agent McGlinn, stationed on the Makah Reservation in 1890:

> This is one of the best officers I have seen in the Indian Service. He knows the Indians remarkably well, understands his business thoroughly, and sticks closely to it. He strictly enforces the regulations of the Department, is breaking up old Indian

> customs, marries the Indians in due forms and records the marriage, and is very strict against intemperance and licentiousness.
>
> The Indians are quite industrious in their way, though rather spasmodic in their labors. They have seasons for berrying, hunting and fishing, and are as dirty and squalid as all fish Indians are. They earn a great deal of money, but have a potlatch system, in which they give away a large amount of money and other articles in feasts... Agent McGlinn is breaking up this custom (ARCIA 1890).

Without the potlatch, the Makahs could not establish important proprietary rights regarding ownership of dances, songs, and other ceremonial and economic privileges. Public transmission of these and other important events for the oral history record could not take place, causing an additional level of social and cultural disruption.

Secret societies were also banned. These complex organizations carried important social functions prior to federal interference. Some secret societies were responsible for healing the sick, while others were important for maintaining social order and punishing transgressors (Ernst 1952). Regardless of the internal function that secret societies served for Makah society and culture, the federal government viewed these activities as savage and demoralizing (Whitner 1977, Marr 1987).

Dances and customs associated with secret societies and winter ceremonials fueled the federal opinion that boarding schools were the only way to eradicate ancestral practices which offended the American sense of morality and decorum. Agents realized that one way to assimilate Makahs and eradicate offensive rituals was to interrupt the transmission of ancestral information within what remained of Makah families. One way they achieved this objective was by separating Makah children from the influence of their family via the use of boarding school. Whitner (1977:28) quotes agent C.A. Huntington as writing, "If the purpose be to civilize these children of darkness, to take them from a barbarous life and put them into a civilized life, the more divorced from the house of their childhood the better".

The United States' policy of assimilation through education increased the socio-cultural confusion. In their attempts to "Kill the Indian but save the man", white educators forced Makah children to leave their families, abandon the Makah language, and adopt white ways of eating, dress, worship, and behavior. Many Makahs who underwent this cultural indoctrination began to feel that traditional activities and beliefs were barbaric, and worked to make their lives more like the non-Indian teachers and administrators who promised modern education, health care and facilities.

In addition to these internal socio-cultural factors, other factors prevented whale hunting from returning to its former prominence. The gray and humpback whale populations were being seriously depleted by non-Makah hunting practices. The population of gray whales was reduced by non-Makah commercial hunters, making offshore hunting in canoes more difficult. Since the Makah style of offshore whaling relied on the ability of land-based lookouts to spot whales which swam close to shore, a lack of these whales effectively decreased the viability of the Makah whale hunt. Only three recorded whale hunts took place during 1905 (AW Smith Papers).

Men could no longer rest assured that the whales would be plentiful, and that canoes at the ready would be called to a hunt by a lookout. In addition, the intensive investment required by a whaler and his crew had not changed; men still had to invest enormous amounts of time in ritual preparation as well as in the care and maintenance of the whaling canoe and other associated gear. Without the plentiful supply of whales which had always graced Makah territory, this intensive investment became too difficult to justify.

So, men turned to a more productive venture that would still make use of the navigation and seafaring skills that both whale and seal hunters needed and used. Fishing had become a more cost effective venture than whaling prior to the turn of the last century.

> The Makahs catch a great many fish, which they ship three times a week to Seattle, where they have a good market for them. They have caught and shipped as high as 10,000 pounds of halibut in one day (ARCIA 1889).

However, offshore whaling in motorized boats was still of interest to American, Canadian, European and Asian parties. As late as 1909, a Seattle based company was considering the establishment of a commercial whaling station at Neah Bay (Webb 1988:177). Plans for the Neah Bay station were eventually abandoned.

After more than a thousand years as whale hunters, Makahs found themselves in a social, ecological and political climate that no longer favored this pursuit. The combined effects of massive epidemics, boarding schools, and government acculturation policies had drastically changed the delicate and complex social dynamic which had supported the traditional Makah whale hunt. The astounding success, then eradication, of the Makah commercial fur seal hunt contributed to this disruption as well. When these two factors are juxtaposed with severely diminishing gray and humpback populations, even subsistence whale hunts became a risky investment. The investment in the Makah whale hunt became even riskier as more Makahs shifted toward the very successful subsistence and commercial venture of ocean fishing.

In spite of these factors, the Makah desire to reinvigorate the whaling tradition never dissipated. Families passed on whaling stories, traditions, and secrets from generation to generation. Whaling designs and crests still decorated public buildings and private homes. Accounts of Makah whalers were read again and again. Whaling displays in the Makah Cultural and Research Center and other museums kept visual scenes in the heads and hearts of Makah people. By 1994, the gray whale population had bounded back to healthy levels; the people in Neah Bay eagerly awaited the opportunity to hunt gray whales again.

THE QUOTA PERIOD

The Makah Tribe has been preparing for this revitalization for decades. Makah people never stopped educating their children about their respective familial whaling traditions. Makah children in the public school on the reservation experienced whaling curriculum every year as a part of the standard school curriculum, as well as through special cultural and linguistic initiatives sponsored by the school district, the Tribe, or any one of a number of funding sources. In fact, collaborative educational efforts through the Makah Cultural and Research Center, the Bilingual program of the Neah Bay School, and other private efforts, have provided whaling curriculum in the schools since the 1960s, with continuous efforts since 1981. While non-Makahs perceived a large temporal gap in the whaling history of the Tribe, tribal members see continuity. Many individuals were patiently waiting for the whaling traditions to be taken from storage and implemented in reality.

The Makah Tribe already has a history of successfully reviving cultural traditions. In the last two decades, the Makah Tribe has reinstituted numerous song, dance, and artistic traditions, and operated a program to restore the Makah language to spoken proficiency on the reservation. These positive accomplishments are due to the enthusiasm, dedication, and knowledge of Makah people, and to the creation of the Makah Cultural and Research Center; this institution manages the cultural resources of the Makah Nation through research, documentation, exhibition and education.

The Makah Tribe created The Makah Cultural and Research Center (MCRC) in response to the massive archaeological collection generated by the Ozette excavation. While the original intent was to create a museum to house the artifacts from the pre-contact levels at Ozette, community opinions shaped the MCRC into a research and education complex that contains numerous exhibition galleries, a language restoration project, archival programs, and a series of educational and interpretive services (Renker and Arnold 1988).

The MCRC has been instrumental in the revival of many Makah traditions. The facility has acted to centralize and incorporate the resources of Tribal government, the Makah community, and other private and public sources to manage Makah cultural resources; many of the resources and traditions that were threatened prior to the creation of the MCRC are now healthy and growing. Consequently, the Makah Tribe had a successful record of bringing ancestral traditions from a dormant state into the active present. The Tribe was confident that the resumption of whaling would be a success, and was not daunted by critics who believed that this tradition could not be reinstated.

On May 17, 1999, the Makah Tribe celebrated a pivotal moment in its long history. At 6:54am, the Creator allowed a Makah crew to realize a collective dream that the Makah Nation had stored in its minds and hearts for seventy long years: they brought a whale home to the Tribe. This pivotal cultural event riveted the attention of the Makah community, and energized Makah Tribal members who believed in, and worked toward, the restoration of this significant cultural practice.

Survey data indicate that some 1200 Makahs watched the climactic moment of the successful hunt on live television. Hundreds of Makahs traveled home to the reservation as soon as they could, wanting to be a part of this significant event. Later that day, some 1400 Makahs welcomed the whale to Front Beach in Neah Bay, and paid honor to the great creature. Many Makahs ate raw blubber right on the spot, and then began the task of preparing the food and resources that the whale contributed to the Makah people.

Butchering the whale proved a huge task for the Makah people. Lack of familiarity with gray whale anatomy, tools which were not well adapted for gray whale meat and blubber, and logistical issues presented immediate obstacles for the butchering process which began on Front Beach. Some confusion also centered on whale parts other than meat and blubber. Most importantly, Makah were able to overcome these problems and continue with the job of processing the whale.

In a matter of hours, a flatbed truck had taken what was left of the whale and driven to the Makah Tribe's fish plant, a processing plant with 800 cubic feet of freezer space and a service entrance large enough to allow the flatbed to drive inside. Within twenty-four hours, Front Beach showed no sign of the momentous event which had happened the previous day. The Makah butchering crew, which included Makahs who had travelled to Alaska to learn processing techniques, had some assistance from a Native Alaskan. Many people worked to butcher the parts of the whale which had not been distributed to Tribal members on the night of 17 May. In addition to meat and blubber, Makahs interviewed during the Makah Household Survey reported requesting and receiving whale lice, sinew, baleen, brain, and heart. Other Makahs reported that they would have liked to receive liver.

cheeks, eyes, and intestines. Some of these items, like whale lice and baleen, are primarily used for ceremonial reasons, while others, can be used in tool production or as food. The bulk of the food products derived from the whale were reserved for the Tribe's celebratory feast, which was to be held on 22 May.

In private homes, people welcomed whale meat, blubber, and other whale parts. Between 17 May and 22 May, some households began to use recipes held in family confidence for decades, and others experimented with techniques used for other sea creatures, like seals and fish. Some 62.9% of Makah households received meat from this whale; 48.4% received blubber. A majority of households which did not receive meat or blubber from this whale reported that they would have welcomed whale products into their homes (Renker 2002).

On 22 May 1999, the Makah Tribe paid tribute to the whale which provided so much to the Tribe, and celebrated a new chapter in its cultural history. Thousands of people attended the parade held during the day, and the feast held in the high school gymnasium later that afternoon. In addition to the local Makahs who attended these events, many Makahs journeyed home to participate.

Unfortunately, this has been the only successful hunt during the quota period. Restrictions on the areas in which Makahs could hunt gray whales, as well as limits on when the hunt could take place hampered efforts to take additional whales as provided by the quota. Further constraints arose from a lawsuit which resulted from a complaint filed in 1997 October. This domestic legal issue halted all Makah whaling for the latter half of 2000 and all of 2001.

Lawsuits were not the only problem that faced the Makah Tribe during this quota period. Four Tribal members alleged that the majority of Makahs were not in favor of the resumption of whaling, and that the Makah Tribal Council had misrepresented the opinion of its people. Fueled by these rumors, anti-whaling advocates staged numerous demonstrations on and off the reservation, and garnered attention from the print and visual media. These efforts also limited the success of the Makah hunt by blocking canoes, scaring whales, and threatening Makah whalers. During the 1999 whaling season, many television spots and published reports contained inaccurate or partially correct information, and included quotes from the anti-whaling Makahs who insisted that the majority of Tribal members did not want the Tribe to hunt whales. These people also accused Makahs of wasting whale products, claiming that tribal members did not like, nor consume whale products. Detractors pointed to alleged wasted meat and blubber from a 1995 whale which was incidentally caught in a fishing net.

Despite these obstacles, more and more Makah men trained to be whale hunters. During the last hunting season prior to the 9 June 2000 court decision, several family-based whaling crews were preparing to hunt, and two family-based crews were granted a total of three permits to go hunting by the local management organization. While no crew brought a whale back to the village, the social benefits of each crew's diligent preparations positively affected dozens of families.

The Makah Reservation in 2002

The contemporary Makah Tribe lives on a 27,151 acre reservation which dominates the northwestern corner of the Olympic Peninsula of Washington State. Other reservation properties include two offshore islands, Tatoosh and Waadah, and a 719 acre parcel of land surrounding the Ozette village site. In addition to these land areas, Makah traditional cultural properties include water territories, like fishing banks, as well (Renker and Pascua 1989). At the time of the Treaty of Neah Bay, Makah traditional cultural properties extended to fishing banks and other ocean grounds as much as 100 miles offshore into the Pacific Ocean. To the north, Makah fisherman accessed rich fishing grounds which are now in Canadian waters, such as Swiftshore and 40-Mile Bank. To the east, Makahs considered the the Strait of Juan de Fuca to be at their disposal to Port Crescent. To the south, Makahs utilized the waters off of Cape Johnson, called **xacic'u?a.** "deep hole". (Swindell 1941, Renker and Pascua 1989).

In 1855, the Tribe signed the Treaty of Neah Bay, which established the boundaries of the reservation but did not recognize the multiple village system. Men negotiating for the Tribe discussed the Makah relationship with the ocean; the Tribe considered the ocean to be territory more important than land. **c'aqa.wi7**, one of these Makah chiefs, articulated this point. "I want the sea. That is my country" (Gibbs 1855). The Indian Claims Commission estimates that "seventy-five to ninety percent of the Tribe's subsistence in 1855 came from the sea rather than land based-mammals or vegetation" (Makah Indian Tribe v. United States, 23 Ind. Cl. Comm. 165, 174 (1970).

Subsequent expansion of the reservation boundaries to include villages other than Neah Bay occurred in 1872 and 1873 via three Executive Orders issued by the United States' government. The village of Ozette was not added to the reservation. Rather, another Executive Order in 1893 created a separate Ozette Reservation to accommodate 64 Makahs who refused to move to Neah Bay (Renker 1994). Today, the Makah Tribal Council is the official governing body of both the Makah Reservation and the Ozette Reservation; the United States Congress ratified the Makah Constitution in 1937 after the Tribe voted to accept the terms of the Indian Reorganization Act in 1936 (Renker 1994).

The Makah Tribe calls itself **q*idicca?a.tx**, "The People Who Live Near the Rocks and the Seagulls". The name Makah is an English version of the term used by a neighboring Tribe for the Makahs. United States' year 2000 census data indicate that there are 1,356 Makahs living in 471 households on the current reservation. Another 1,117 Makahs live away from the reservation (Makah Planning Office 2002). Most reservation residents live in the reservation's single centralized village, Neah Bay, location of the public school, the post office, the general store, the health clinic, and other amenities. While Neah Bay is certainly the hub of reservation activity, a growing population and a housing shortage have encouraged Tribal members to live in more remote reservation locations. Two popular settlements outside Neah Bay are at the sites of former ancestral villages, such as **wa?ac'** (Why-atch) and **c'u.yas** (Tsoo-yess).

Like other locations on the Olympic Peninsula, economic conditions on the reservation have steadily declined since 1989. The Pacific salmon crisis and controversies surrounding timber practices in the area have increased the economic pressure on the reservation population. In addition, the 1989 deactivation of the United States' Air Force Base operating on the Makah Reservation created an employment crisis for the Makah community. Approximately 200 jobs left the reservation when the base closed, and plans to develop a new job source have not yet proved fruitful. In addition, fluctuations in the reservation's natural resources, commercial fishing, tourism, and sport fishing have impaired the Tribe's ability to ensure reliable incomes and subsistence sources for its members. The average unemployment rate on the reservation is approximately 51%, and fluctuates seasonally; almost 49% of reservation households have incomes classified below the federal poverty level, and 59% of the housing units are considered to be substandard (Makah Planning Office 1992). The average household income on the reservation is approximately $5,000.00, compared with approximately $40,000.00 in the rest of the state of Washington (Income 2000, US Census Bureau).

Fishing variations have had an especially drastic effect on Makah families. 95.2% of Makah households have someone in the residence who fishes; 62.8% of these households consider fishing to be the major occupation in the home (Renker 1988). While the decrease in the cash economy of the reservation is a clear result in years of diminished commercial fishing, there is a more insidious affect on the subsistence level.

Ocean fishing has replaced whale hunting as the backbone of Makah household economy. In addition to the cash that fishing generates, another level of economy operates, that of traditional reciprocal systems. Even households without a fisherman derive food, money or other goods from a fisherman who is a relative or a friend. Fish is a medium of exchange on the Makah reservation, and is also an indicator of a fisherman's regard for the individual to whom the fish is given. Indeed, people on the reservation rely on the Makah fleet for substantial contributions to community meals and community functions.

100% of the Makah households on the reservation engage in some kind of reciprocal networks which involve fish at some level of exchange: 80.4% of households receive fish from someone who fishes; 85.3% of households give fish to other family members, friends and community meals; 84.1% of households who smoke fish give it to other family members, friends and community meals; and 35.3% of households receive goods or money from a fisherman when the season is successful (Renker 1988:8).

The 1988 Makah Household Fishing Survey also uncovered another pattern of interest in the Makah community. Over 50% of the reservation households used traditional Makah foods at least once a week; these foods included items like fermented salmon eggs, smoked fish heads and backbones, halibut cheeks and gills, and dried fish (8). 40.2% of Makah households eat fish a few times each week, and 66.7% eat fish at least once each week. These data demonstrate the community's preference for and reliance upon traditional, local, marine foods which are often not favored by the dominant American population.

Recent research available in Aradanas (2001) demonstrates the tenacity of the 1988 subsistence profile. The Makah reliance on seafood products continues to be derived from subsistence traditions, and the existence of redistributive and reciprocal networks remains strong. One striking datum compares the amount of fish consumed in Makah households with that of the average American household. The annual per capita consumption of fin fish and shellfish for the average Makah is a staggering 126 pounds, some eight times the consumption rate for the average American. While fish comprises 55% of the Makah diet, it represents only 7% of the diet of the average American (84).

Recent regulatory and ecological circumstances have had an impact on Makah marine subsistence practices. New, stringent restrictions on salmon fishing, and the yearly fluctuations in fishing quotas, restrict the ability of Makah fisherman to generate a reliable surplus for distribution. This situation has affected many households which rely on surplus fish to meet subsistence needs.

Additional ecological circumstances periodically caused by red tides and oil spills have negatively affected subsistence households which rely on shellfish resources. These events have reduced the ability of Makahs to utilize the shellfish resource as effectively as in the past. Financial compensation awarded to Tribal members as a settlement for the destruction of subsistence shellfish during one of these oil spills can not restore the health of the ecosystem.

Still other factors are affecting subsistence issues pertinent to the Makah Tribe. The Makah Tribe, like many other governmental agencies, cut its operating budget by some 10%* for the 2002 operating year. Cutbacks in food and financial support from public assistance programs affects families which are already economically stressed.

Teen age pregnancies, high school drop outs, substance abuse problems, and an increasing juvenile crime rate indicate that the

Makah community is one still in flux: the enormous social disruption caused by epidemics, boarding schools, and federal policy is still not over. Entire social, cultural, subsistence, and ceremonial institutions were either repressed, eradicated or decimated, and no structural equivalent was substituted. Continuation of the Makah whale hunt would provide the Makah Tribe with a reliable mechanism to repair the damage done to the social infrastructure during the years of forced assimilation. Additional whale hunts would certainly bring important subsistence benefits, as well as other important social considerations.

The Household Whaling Survey (HWS)

As the end of 2001 drew near, the Makah Tribal Council began preparing to submit a request for a new gray whale quota. The Makah Tribal Council wanted to address the concerns of citizens who insisted that Makahs did not support whaling, and that whale products were being frivolously wasted. Clarifying and quantifying the sentiments of enrolled Tribal members was extremely important, so the Makah Tribal Council commissioned a household survey in December 2001. This survey, The Household Whaling Survey (Renker 2002) asked Makahs to report their opinions about the whale hunt, as well as levels of participation in whaling-related activities, including the preparation and consumption of whale products. A copy of the instrument is included in Appendix 2.

Results from the Household Whaling Survey (HWC) were interesting and conclusive. The survey interviewed 34.6% of the Makah households on the reservation. 49.7% of the respondents were male; 50.3% of the respondents were female. 100% of the respondents considered themselves active members of the reservation community, attending a variety of community events, both cultural and otherwise.

The 163 respondents reported information about a population of an additional 268 household members.

Of the 163 respondents, 93.3% believed that the Makah Tribe should continue to hunt whale, 5.5% believed that the Makah Tribe should not hunt whale, and 1.2% were undecided. Clearly, a randomly selected, significant percentage of respondents were supportive of the Makah Tribe's decision to pursue the Treaty Right of hunting a whale that is no longer on the Endangered Species List. It is also interesting to note that three of the respondents who do not want the Makah Tribe to hunt whale do want whale products, like meat, bone, and/or blubber.

When asked to state a reason for this belief, respondents provided a wide variety of opinions. (Because multiple responses were allowed for this question, the positive percentage is based on the number of respondents who answered positively, R= 152.) Of the respondents who felt that the Makah Tribe should continue to hunt whale, 46.1% cited the Treaty Rights as the reason, 35.5%

noted that food, better nutrition, or a traditional diet was the reason, and 36.2% felt that maintaining or restoring some aspect of cultural heritage or tradition was the most important reason. 20.4% indicated that moral or spiritual benefits, such as changed lifestyle, better discipline, or increased pride , should prompt the Makah Tribe to continue to whale.

Respondents also provided a variety of multiple responses to the question, "Do you think whale hunting has been a positive thing for the Tribe?". The most popular response was given by 51.6% of the respondents, who indicated a change for the better in morals or social values: pride, self-esteem, changing lifestyles, abstaining from drugs and alcohol, better male responsibility, and positive role models for youth. 43.8% of respondents considered uniting the Makah Tribe, and other Tribes, as the most positive aspect of whale hunting. Respecting Treaty Rights garnered a response from 25.5% of the respondents, while maintaining or restoring cultural traditions was the reason provided by 32.7% of the respondents.

A surprising number of individuals reported that they were involved in whaling-related activities since the 1999 whale was caught. 38.7% of respondents indicated that they have participated in whaling ceremonial activities, 30.1% have cooked whale, and a resounding 81% reported eating whale products. Respondents related that 70.9% of the household members included in the study ate whale products, and that 21.6% participated in whaling ceremonial activities.

Another significant result that demonstrates overwhelming community support for the Makah whale hunt is found in the question (#45) which asks respondents to indicate subjects about which they would like more information. The majority of respondents wanted information about preparing whale products, and cleaning and carving whale bone. This question also elicited a response that was not planned. 25% of respondents indicated that they would like to share family recipes and techniques for preparing whale meat, rendering oil, and butchering whale. Given the history of secret, family information regarding whale related issues in the Makah Tribe, the fact that respondents volunteered to provide knowledge of practices, techniques, and recipes is a testament to the community's support for the continued use of whale products.

Community support for, and interest in, the Makah whale hunt is also shown by reports of participation in the actual events surrounding the successful 1999 hunt. Of the 163 respondents, 78.5% were watching live television when the whale was taken, as were 67.2% of the respondents' household members. 81.6% of the 163 respondents were present at Front Beach in Neah Bay when the whale was brought ashore, as were 87.6% of the household members. Numerous respondents who did not attend either of these events qualified their response by telling the surveyor that they had to work or were out of town, and would have attended had they been in Neah Bay.

Sixty-four respondents reported that a total of 226 non-resident Makahs billeted in their respective homes from 17 May to 22 May 1999. This datum indicates that Makah support for the whale hunt is not restricted to reservation residents. The Makahs who traveled home to the reservation felt the need to be on ancestral territory, with relatives and friends, and be a witness to the crucial events surrounding the successful whale hunt.
80.4% of the 153 respondents reported attending the Makah Tribe's celebration in honor of the first successful whale hunt in seventy years. 78.6% of these respondents attended the parade early in the day on 22 May, and 95.4% attended the feast later that afternoon. These respondents indicated that 180 (67.2%) of their household members went to the parade, and 191 (71.3%) joined the crowds at the dinner. Levels of participation like those reported here suggest the pride and happiness felt by Makahs who were observing more than the successful hunt; they were celebrating the validation of the traditions and priorities established by ancestors and secured by the signers of the Treaty of 1855.

III. WHALE HUNTING AND THE MAKAH TRIBE: THE NUTRITION COMPONENT

Prior to contact with Europeans, the Makah people used a wide variety of foods. Because of their location on the tip of the Olympic Peninsula, the Tribe was able to exploit land and sea animals, including elk, deer, bear, seal, and a diverse population of fish, shellfish, and other maritime species. In spite of this abundance, "whale meat and oil were among their principal foods" (Densmore 1939:13). Not only were these foods of high status, their role in the nutrition and ceremony of the Makah people cannot be underestimated.

Huelsbeck (1988a:1) estimates that the amount of whale meat, blubber, and oil represented in the faunal assemblage at Ozette indicates that a significant percentage of the food at Ozette could have come from cetaceans. Whale meat was prone to spoil easily, especially when the process of towing a dead animal home took several days. This tendency reduced its importance in the precontact and early historic diet. About 10% of the food Makah people derived from whales can be attributed to meat (1988a:10). Oil however, was not subject to spoilage, and could be kept indefinitely as long as it was rendered properly (Swan 1869).

This important food product was recovered from natural pockets of oil within individual whales, as well as extracted from whale bones and rendered from blubber. Ommanney (1971:55) estimates that some 50% of whale bone weight could be reduced to oil. Faunal remains from Ozette indicate that bones were hacked and gouged to allow oil to both drip from the bones and to be recovered through boiling (Fiskin 1980). Blubber was primarily used as a vehicle to recover oil. Approximately 65% of the weight of blubber is reduced to oil through a rendering process (Huelsbeck 1988a:9).

Oil was an important nutritional item for a variety of reasons. Elders report that whale oil was used as a dip with a variety of foods, including dried fish and herring eggs, as well as potatoes in historic times. Swan(1869) and Densmore(1939) corroborate these accounts. Since dried fish and herring eggs had been processed to remove all natural oils in order to contribute to their longevity, the addition of whale oil added taste as well as nutrients to the precontact and historic Makah diet.

Oil was also the only nutritional product which figured prominently in the ceremonial life of the Makah people. An oil potlatch, given when a whaler had an abundance of oil, demonstrated his generosity with this commodity, and was a rare and special occurrence. Whale oil was the only edible item which could be the focus of a special potlatch, complete with particularized songs and other ceremonial items (Densmore 1939).

While blubber's importance in both precontact and early historic times was clearly as a precursor to oil, "blubber was also eaten, usually cured first" (Densmore 1939:14). It was most popular when broiled next to a fire, and was the standard pacifier for babies, according to oral and ethnographic accounts.

For approximately 2,000 years, the Makah people relied on the nutritional products of the whale, and evolved as a biological population within this context. Archaeological data confirm the fact that Makah people were using whale as a food resource for some 750 years before the technique of hunting whale was developed (Wessen 1990). Faunal remains from a number of sites indicate that Makahs were butchering stranded or drift whales long before the technology to hunt the creatures evolved.

When circumstances prevented the procurement of whale products for subsistence, Makahs compensated by increasing their reliance on other subsistence foods. In spite of the changes that have affected the Makah people, subsistences foods are still an important part of reservation life. Makah hunters still procure land game like elk, deer, and bear to fill winter freezers and reduce cash expenditures. The resources of the sea and the intertidal zones are an important food source (Renker 1988), despite the decreasing abundance described previously.

Recent investigations focusing on the subsistence practices of the Makah Tribe in forest areas (Renker 1994) and the intertidal zone (1993) detailed a viable and thriving culture. Elders described the subsistence philosophy of the Makah people, and stressed the importance of teaching these values to younger people. Younger Makahs participating in these studies were familiar with these teachings, and practiced these subsistence rules when hunting or gathering food.

The most important subsistence strategy to the Makah people is the axiom, "Take only what you need." Makah elders emphasize this principle when the discussion centers on any type of hunting, gathering, or fishing activity (Renker 1993:14). Other common subsistence rules include: 1)choosing the procurement area so that the available biomass is not adversely affected by the amount one needs to harvest, 2) choosing the procurement area that limits the need to travel, and 3) choosing the food to hunt or gather based on the seasons of the food in question; one tries to avoid disturbing reproductive cycles, for example. The continuity of these subsistence practices and values reinforces the social and cultural integrity of the Makah people, and constantly reminds Tribal members of their intimate, and long standing, relationship with the environment.

These subsistence foods and practices are very important when considering the nutritional needs of contemporary Makah people. Modern research concentrating on the nutritional needs of an anthropologically defined population emphasizes " the interactions of genetics, physiological processes, population characteristics, and a wide variety of nutrition-related diseases" (Pelto 1989:x). Using these criteria, a discussion of the profile of the Makah community yields interesting results when the focus is the use of the whale as food.

Consider the following. American Indian people are generally considered to be one of the most unhealthy populations living within the United States of America; this observation is especially true for natives living within the confines of a reservation. The infant mortality and life expectancy rate for reservation residents is the lowest of all American citizens (IHS 1995).

The diminished life expectancy on American Indian reservations is compounded by the fact that certain systemic illnesses linked to food and nutrition appear in statistically higher percentages among these populations. Diabetes, for example, is 234% more prevalent among American Indian people than in all other U.S. races (Indian Health Service 1995: 5). As a matter of fact, "American Indians have the highest rates of diabetes in the world" (NIH 1996:26).

A statistic of this magnitude is especially intriguing when one considers the nutritional history of indigenous American Tribes, and their respective divergence from the food traditions which mark western populations. Prior to contact with Europeans, North American Tribal people consumed foods which were native to their respective environments. Natives of the Great Plains and the Pacific Northwest were hunters and gatherers who utilized the plant and animal species which lived in and migrated through their territories. Natives of the Southwest and the Northeast augmented nature's bounty by cultivating crops, most of which were not available in Europe. (It is interesting to note that Makah people did not utilize plant foods to a great degree (Gill 1983), and still experience many digestive problems with diets high in fiber and cruciferous vegetables (IHS 1991).)

When traditional Tribal life was disrupted by contact with non-Natives, food traditions were some of the first to be affected. By the time the Treaties called for the forced placement of Tribal people on reservations in the 1850s, very few Tribes could still practice the subsistence patterns which had sustained their ancestors.

Hunting and gathering tribes were restricted because their ability to utilize former usual and accustomed resource areas was diminished; the reservation system made it possible for non-Native populations to acquire and control lands and waters once available to Tribes. Through Treaties, agricultural tribes lost valuable land capable of cultivation to non-Indian farmers, and were given less productive reservation land as compensation. Additional stresses on native food traditions appeared when the American westward expansion and growing commercial interests decimated food animals once plentiful before contact.

No matter what the individual Tribal food tradition, professionals in the health and social science fields appear to agree that the introduction of western foods like refined sugar and flour, beef, and lard have had a dramatic negative effect on the health of American Tribal members in general. Many of these foods were distributed to reservation natives by the American government in the form of annuities and supplies. Specific studies have directly linked the introduction of western foods into the diet of Tribal entities to a variety of health problems (Hildes 1966:501, Keenleyside 1990:13, NIH 1996, and others).

American health organizations such as The National Institutes of Health (NIH), the National Institute of Diabetes and Digestive and Kidney Diseases, the Public Health Service, and the Department of Health and Human Services, are conducting research to try to determine why American Indian populations are subject to food related illnesses at a rate so much greater than the rest of the population. In many cases, reservation residents contract these illnesses at about half the age of Caucasians, according to the Indian Health Service (1995).

Many current studies are now investigating the link between genetics and the acquisition of nutrition related illness. The most important of these studies focuses on the Pima Indians of Arizona, a group with a food tradition dating back some 2,000 years; their traditional diet and lifestyle were disrupted about 200 years ago, causing major social and nutritional changes. The high rates of diabetes and obesity in this Tribe prompted the National Institutes of Health and several other American health organizations to undertake a long-term study of this population.

Thirty years of concerted studies with the Pima people have demonstrated results applicable to other Tribal people in North America, including the Makah. Research indicates that discrete populations evolve a genetic code that is uniquely suited to a particular environment and its food resources. This genetic code regulates the biochemical processes in the body that produce enzymes, proteins, fatty acids, and thousands of other chemicals which function within the human body. Scientists developing the genetic map for the Pima people have already identified a number of genetic variations within this community that are different from those in the white population (NIH 1996:6). These variations may explain why Pima people eating western foods are more prone to develop diabetes, obesity, and the long-term consequences of these health problems than other populations.

Like the Pima people, Makahs found their traditional pattern of food use interrupted by western contact about 200 years ago. The traditional diet rich in fish and sea mammal oils was gradually replaced by a western diet which considered beef, dairy products, and cereals to be the most nutritious. The whale products which once comprised a principal part of the diet were no longer available, and the whale oil which supplemented the preserved foods of the winter season was replaced by butter and margarine. A high proportion of lactose intolerance became apparent in the

Makah community, a fact not surprising for a population with no previous historic or cultural link to cattle or dairy animals (NIH 1996).

Given this perspective, certain IHS data become especially intriguing. For example, Indian people of the Northwest Coast have the highest rate of digestive illnesses of all American Indian people. Such illnesses comprise the leading cause of hospitalization for native people in this area. For northwest people, 16.5 % of all hospitalizations pertained to digestive diseases, compared to the next highest rate of 12.3% for Navajo people (Indian Health Service 1995). And, in terms of overall nutritional health, Makah and northwest people are at a potential genetic disadvantage because these populations evolved without a reliance on high fiber, low fat foods, like the Pimas.

Consequently, the reintroduction of whale products, especially whale oil, may produce dramatic results in the health of the Makah people. Current research in the importance and application of Essential Fatty Acids (EFAs), such as those found in sea mammals and fish oils, support the contention that the inclusion of whale oil in the Makah diet may have crucial implications for the health of the Makah community. This fact is not as surprising as it may seem when one considers the historic western use of products like cod liver oil as an important nutritional supplement.

For example, the Washington Office of the Superintendent of Public Instruction (OSPI) details the fact that Makah children attending public school on the reservation exhibit Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity Disorder (ADHD), reading disabilities, and dyslexia at a rate almost twice that of the rest of the population (1996). Clinical studies which focused on the correlation between EFAs and these conditions report that children receiving supplemental EFAs demonstrate significant improvement in the ability to pay attention and read effectively (Stevens, Zentall, et al:1995; Stordy:1995).

In addition, marine EFAs have been clinically demonstrated to improve conditions like rheumatoid arthritis (Belch, Amsell, Madho, Dowd, and Sturrock:1988) and diabetic neuropathy (Keen, Payan, Walker,et al:1993). Both conditions are prevalent in the Makah community and especially within descendants of whaling families.

Whale oil and whale products may be the answer to these problems within the Makah community, and may provide researchers with an analogous study situation to that within the Pima community. Marine fish like salmon are becoming more scare within Makah households due to increasingly stringent quotas which disrupt traditional systems of reciprocity (Renker 1988). Consequently, access to whale products could provide Makahs with a nutritional remedy to many community health problems.

Access to whale products can provide the Makah community with important nutritional opportunities that carry implications for non-Makahs. Like their Pima counterparts, Makahs may be able to augment knowledge about the relationship between genetic patterns, nutrition, and health, especially in the area of EFAs. Community members are ready to rise to this challenge and re-learn the techniques necessary to make the food from the whale a part of Makah life again.

This section is not intended to imply that we can scientifically elucidate the nutritional advantages of whale products, especially oil, for the Makah Tribe. However, recent national studies provide some points of interest. Investigations of local populations with a demonstrable time depth indicate that regional genetic factors evolve in order to maximize the dynamic relationship between certain foods and the patterns in which these foods are consumed by subsistence populations. Consequently, it is reasonable to assume that increasing the consumption of locally available foods consumed through the millenia could confer substantial health benefits.

Such is the case for whale products and the Makah Tribe. The food products of the gray whale have sustained the Makah people for over 2,000 years; the Tribe has been less culturally and physically healthy since this access was restricted seventy years ago. A restoration of the ability to hunt the gray whale will provide the Makah Tribe with a key element of its culture that has been able to exist only in the flickering images of oral history for seven decades. The social fabric of the community will be able to patch its thin areas once the hunt is restored, and the physical health of the Makahs will increase once there is enough whale meat and oil to feed its children.

In addition, the addition of whale products will help to replace other subsistence resources which are in decline. As fish and shellfish quantities decrease on the reservation, the availability of whale products will prevent people from having to spend precious cash to replace current subsistence foods.

The resumption of the whale hunt will provide more than subsistence foods for the body. It will provide spiritual subsistence to the soul of the Makah people.

APPENDIX 1

MAKAH ALPHABET

The Makah alphabet variation used in this document is a function of printer and software limitations. The Makah alphabet is a variation of the International Phonetic Alphabet, and is presented in Renker (1987). No capital letters are used in this alphabet.

The following substitutions are used:

= IS EQUIVALENT TO A BARRED L

7 IS EQUIVALENT TO A BARRED LAMBDA

* IS EQUIVALENT TO A RAISED W

' IS EQUIVALENT TO A GLOTTAL MARK

? IS EQUIVALENT TO A GLOTTAL STOP

. IS EQUIVALENT TO A LENGTH MARKER

APPENDIX 2

CONFIDENTIAL HOUSEHOLD WHALING SURVEY

This survey is commissioned and sanctioned by the Makah Tribal Council, and is being administered by the Makah Cultural and Research Center. The data from this survey will be used in creating the new Needs Statement. This document will be a part of the United States' request to provide the Makah Tribe with another five year quota to hunt gray whales; the request is made to the International Whaling Commission.

Your name and the information you provide are strictly confidential. No information you provide will be linked directly to you in the Needs Statement. In fact, the author of the Needs Statement will not even know who has answered these surveys.

The completed surveys will be sealed and placed in the Archives of the Makah Cultural and Research Center. Access to these documents will be restricted by the Makah Tribal Council.

The respondent for this survey must be a Makah who is 21 years of age or more. For the purposes of this survey, a household member is considered to be any person that is residing in your house at the time of this interview. This survey is interested in the Makah members of your household.

ABOUT YOU AND YOUR MAKAH HOUSEHOLD MEMBERS...

1. Are you Makah? Yes _______ No ________

   Age ___________ Gender _______________

2. Do you have any Makahs living in your household? Yes _____ No____

   How many?______________

   If yes, complete 2a. If no, skip to 3.

2a. List all Makahs by relationship, gender, and age.

3. Where were you born? _______________________

4. Do you attend Neah Bay village events? Yes ________ No________

4a. If yes, please check all that apply.

Sporting Events ____________________

Community Dinners _________________

Potlatches _________________________

Health Presentations ________________

Makah Days Events ___________________

MTC Quarterly/Annual Meetings __________

Neah Bay K-12 School Events ____________

Other (Please specify)_______________________

ABOUT YOUR MAKAH HOUSEHOLD MEMBERS AND WHALING IN 1999...

5. Were you watching television when the 1999 whale was harpooned and killed?
Yes ____________ No ______________

6. Were any of your Makah household members watching TV when the 1999 whale was harpooned and killed?
Yes ____________ No ______________

7. If yes, how many Makah household members were watching TV when the 1999 whale was harpooned and killed?
____

8. Were you on Front Beach, or in a boat/canoe on the water, when the 1999 whale was brought ashore?
Yes ____________ No ______________

9. Were any of your Makah household members on Front Beach or in a boat/canoe on the water, when the 1999 whale was brought ashore?
Yes ____________ No _______________

10. If yes, how many? _______________________

11. Did any Makahs who live off the reservation come to spend the night at your house from May 17, 1999, the night the whale came ashore, to May 22, 1999, the night of the Tribe's celebration?
Yes ___________ No ________________

12. If yes, how many non-resident Makahs spent the night at your house from May 17, 1999 till May 22, 1999.

____

13. Did you attend the Makah Tribe's celebration of the 1999 whale on May 22, 1999?

Yes ____________ No ______________

14. If yes, which events? Check all that apply.

Parade ______________________

Dinner ______________________

15. If you attended the dinner, in which way did you participate? Check all that apply.

Attended the dinner ______________________

Helped butcher the whale__________________

Helped cook the whale ____________________

Helped cook other items at the dinner _____________

Helped serve at the dinner ___________

Helped set up the gym __________

Helped decorate the gym ____________

Sang at the dinner ________________

Other (Please specify) ___________________

16. Did any of your Makah Household members attend the Makah Tribe's celebration of the 1999 whale on May 22, 1999?

Yes ____________ No _____________

17. If yes, how many Makah household members attended the Makah Tribe's celebration of the 1999 whale on May 22, 1999?__________________

18. For each Makah household member, please check which events s/he attended. Check all that apply.

	#1	#2	#3	#4	#5	#6
Parade						
Dinner						

19 If Makah household members attended the dinner, in which way did each participate? Check all that apply.

	#1	#2	#3	#4	#5	#6
Attend the dinner						
Helped butcher the whale						
Helped cook the whale						
Helped cook other dinner items						
Helped serve at the dinner						
Helped set up the gym						
Sang at the dinner						
Other (Please specify)						

20. Did your household receive meat from the 1999 whale?
Yes____________ No______

If no, skip to question 23.

21. What did you do with the meat? (Check all that apply.)

Prepare it _______________

Redistribute it _____________

other ______________________

22. If you prepared it, what did you do? (Check all that apply.)

Jerky ________

Roasts ________

Stew ________

Steaks ________

Smoked meat ______

Other (Please specify) ______________

Now skip to question 24.

23. Would you have liked to get meat from this whale?
Yes ________ No ____________

24. Did your household receive blubber from the 1999 whale?
Yes ________ No ____________

If no, skip to question 27.

25. What did you do with the blubber? (Check all that apply.)

Prepare it ________

Redistribute it ______

Other ____________

26. If you prepared it, what did you do? (Check all that apply.)

Smoked it ____________

Rendered it ____________

Ate it raw ____________

Pickled it ____________

Boiled it ____________

Cosmetics ____________

Other (Please specify.) __________________

Now skip to question 28.

27. Would you have liked to receive blubber from the 1999 whale?
Yes ________________ No ________________

28. Did your household receive whale oil from someone as a result of the 1999 whale?
Yes ________________ No ________________

29. Did your household receive any other parts from the 1999 whale?
Yes ________________ No ________________

30. If yes, what parts did your household receive? What did you do with them?

31. Were there any other parts of the 1999 whale you would have liked your household to receive?
Yes ________________ No ________________

32. If yes, which ones?

ABOUT YOUR MAKAH HOUSEHOLD AND OTHER WHALING ACTIVITIES...

33. Would you like to have whale oil in your household on a regular basis?
Yes ________________ No ________________

34. Would you like to have whale meat in your household on a regular basis?
Yes ________________ No ________________

35. Would you like to have whale blubber in your household on a regular basis?
Yes ________________ No ________________

36. Would you like to have whale bone in your household on a regular basis?
Yes ________________ No ________________

37. Please check all whaling activities that you have been involved in since the 1999 whale was caught.

Member of whaling crew ____________

Member of Whaling Commission ________________

Butchering whale _________________

Cooking whale _______________

Smoking whale _______________

Rendering oil___________________

Eating whale products _________________

Redistributing whale products to other Makahs___________

Participating in whaling ceremonial activities _____________

Carving whale bone ______________

Member of whaling support crew ___________________

Other (Please specify.) __________________

38. Please check all whaling activities that any HH members have been involved in since the 1999 whale was caught. Please specify for each household member.

	#1	#2	#3	#4	#5	#6
Member of whaling crew						
Member of Whaling Commission						
Butchering whale						
Cooking whale						
Smoking whale						
Rendering oil						
Eating whale products						
Redistributing whale products						
Participating in whaling ceremonial activities						
Carving whale bone						

Member of whaling support crew

Other (Please specify.)

ABOUT YOUR OPINIONS REGARDING WHALE HUNTING...

39. Should the Tribe continue to hunt whale? Yes ________ No ________

40. What are the reasons for your answer?

41. If you answered yes to 39, do you think whale hunting has been a positive thing for the Tribe? Yes ____________ No ____________

42. What are your reasons for this answer?

43. Would you like to have more access to whale products in the future?

    Yes ______________ No ______________

If yes, go to 44. If no, go to 45.

44. Which whale products would you like more of in the future?

    raw meat ______________________

    meat cooked or preserved by someone else ____________

    raw blubber _______________

    whale oil _______________

    bone _____________

other (specify) ____________

45. Would you like more information about any of the following? Check all that apply.

Whale hunting ____________

Cooking whale meat ______________

Butchering whale ___________

Rendering oil ______________

Smoking meat _____________

Cleaning whale bone ____________

Carving whale bone __________

Other (Specify) __________

46. Are there any other comments you would like to make?

APPENDIX 3

MAKAH HOUSEHOLD SURVEY METHODOLOGY

The survey was administered by the Makah Cultural and Research Center, an institution with twenty-two years of experience conducting household surveys on the Makah Reservation. The author of the instrument conducted numerous household surveys in the Makah community over the last twenty-two years; each of these surveys employed the same methodology. Results were tabulated and analyzed by the developer of the survey instrument.

In order to conduct the most accurate survey possible, the Household Whaling Survey is based on the following:

1. Names of households to be surveyed were drawn randomly from the Makah Tribe's Turkey Distribution List. This list contains all households on the reservation in which at least one enrolled Makah resides. 34.6% of the Tribe's 471 Makah households were interviewed.

2. All surveys were conducted in person by an enrolled Makah trained in proper survey procedures, who insured all respondents that confidentiality would be protected.

3. The survey contacted 217 of the Tribes 471 households. Of this number, 159 households agreed to be interviewed. Interestingly enough, four of the Makahs who publicly challenged the Tribe's decision to whale had their respective names randomly drawn to be surveyed. Because the Tribe wanted to minimize external influences on the survey administration, these four individuals were not surveyed. However, to maintain proper responses, these individuals were marked to answer negatively to all questions which asked for positive or negative opinions regarding Makah whaling, access to whale products, and use of whale products, as per their publically expressed opinions. Question marks indicate responses for which the survey had no information at all.

   Counting these four individuals, the total number of respondents for the survey is tallied at 163. Percentages are tallied accordingly. Five household volunteered to be included in the survey. While these households were encouraged to complete a survey form, these five respondents were NOT included in the random population of 163.

4. All survey respondents had to be enrolled Makahs with a reservation household; all respondents also had to be twenty-one years of age or older. Survey methodology assumes that each respondent is capable of answering questions about his/her own ideas and activities regarding whaling, as well as the activities of his/her household members regarding whaling.

5. A master list which related each chosen household to an exclusive number was kept at the Makah Cultural and Research Center to avoid duplication and protect confidentiality. Surveyors returned completed surveys to the Makah Cultural and Research Center, which maintained security for the documents. All completed surveys are archived at the Makah Cultural and Research Center.

6. The author/tabulator did not know the names of the respondents, and related to surveys by number only.

7. Certain questions allowed for multiple responses. Others did not. In addition, certain questions only allowed respondents who had answered a previous question a particular way to answer. Incidents of both types are indicated on the survey instrument, which is appended in 2. On the tabulation sheet, the base number of respondents is indicated by R= . R=163 means that the percentage is calculated based on the answers of 163 respondents.

8. Internal checks and balances were placed in the instrument to encourage data validity.

9. Answers are reported as percentages calculated from the base number of respondents appropriate to each question. Percentages are rounded to the nearest tenth.

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TREATY WITH THE MAKAH, 1855.

Jan. 31, 1855.

12 Stat., 939. Ratified Mar. 8, 1859. Proclaimed Apr. 18, 1859.

Articles of agreement and convention, made and concluded at Neah Bay, in the Territory of Washington, this thirty-first day of January, in the year eighteen hundred and fifty-five, by Isaac I. Stevens, governor and superintendent of Indian affairs for the said Territory, on the part of the United States, and the undersigned chiefs, head-men, and delegates of the several villages of the Makah tribe of Indians, viz: Neah Waatch, Tsoo-Yess, and Osett, occupying the country around Cape Classett or Flattery, on behalf of the said tribe and duly authorized by the same.

Surrender of lands to the United States.

Boundaries.

ARTICLE 1. The said tribe hereby cedes, relinquishes, and conveys to the United States all their right, title, and interest in and to the lands and country occupied by it, bounded and described as follows, viz: Commencing at the mouth of the Oke-ho River, on the Straits of Fuca; thence running westwardly with said straits to Cape Classett or Flattery; thence southwardly along the coast to Osett, or the Lower Cape Flattery; thence eastwardly along the line of lands occupied by the Kwe-déh-tut or Kwill-eh-yute tribe of Indians, to the summit of the coast-range of mountains, and thence northwardly along the line of lands lately ceded to the United States by the S'Klallam tribe to the place of beginning, including all the islands lying off the same on the straits and coast.

Reservation.

Boundaries.

Whites not to reside thereon unless, etc.

Roads may be made.

Other friendly bands may be placed thereon.

ARTICLE 2. There is, however, reserved for the present use and occupation of the said tribe the following tract of land, viz: Commencing on the beach at the mouth of a small brook running into Neah Bay next to the site of the old Spanish fort; thence along the shore round Cape Classett or Flattery, to the mouth of another small stream running into the bay on the south side of said cape, a little above the Waatch village; thence following said brook to its source; thence in a straight line to the source of the first-mentioned brook, and thence following the same down to the place of beginning; which said tract shall be set apart, and so far as necessary surveyed and marked out for their exclusive use; nor shall any white man be permitted to reside upon the same without permission of the said tribe and of the superintendent or agent; but if necessary for the public convenience, roads may be run through the said reservation, the Indians being compensated for any damage thereby done them. It is, however, understood that should the President of the United States hereafter see fit to place upon the said reservation any other friendly tribe or band to occupy the same in common with those above mentioned, he shall be at liberty to do so.

Indians to settle on reservation within a year.

ARTICLE 3. The said tribe agrees to remove to and settle upon the said reservation, if required so to do, within one year after the ratification of this treaty, or sooner, if the means are furnished them. In the mean time it shall be lawful for them to reside upon any land not in the actual claim and occupation of citizens of the United States, and upon any land claimed or occupied, if with the permission of the owner.

Rights and privileges secured to Indians.

Proviso.

ARTICLE 4. The right of taking fish and of whaling or sealing at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the United States, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting and gathering roots and berries on open and unclaimed lands: *Provided, however*, That they shall not take shell-fish from any beds staked or cultivated by citizens.

Payments by the United States.

ARTICLE 5. In consideration of the above cession the United States agree to pay to the said tribe the sum of thirty thousand dollars, in the ner, that is to say: During the first year after the ratifi- three thousand dollars; for the next two years, twenty-

APPENDIX B

five hundred dollars each year; for the next three years, two thousand dollars each year; for the next four years, one thousand five hundred dollars each year; and for the next ten years, one thousand dollars each year; all which said sums of money shall be applied to the use and benefit of the said Indians, under the direction of the President of the United States, who may from time to time determine at his discretion upon what beneficial objects to expend the same. And the superintendent of Indian affairs, or other proper officer, shall each year inform the President of the wishes of said Indians in respect thereto.

How to be applied.

ARTICLE 6. To enable the said Indians to remove to and settle upon their aforesaid reservation, and to clear, fence, and break up a sufficient quantity of land for cultivation, the United States further agree to pay the sum of three thousand dollars, to be laid out and expended under the direction of the President, and in such manner as he shall approve. And any substantial improvements heretofore made by any individual Indian, and which he may be compelled to abandon in consequence of this treaty, shall be valued under the direction of the President and payment made therefor accordingly.

Appropriation for removal and for clearing and fencing land, etc.

ARTICLE 7. The President may hereafter, when in his opinion the interests of the Territory shall require, and the welfare of said Indians be promoted thereby, remove them from said reservation to such suitable place or places within said Territory as he may deem fit, on remunerating them for their improvements and the expenses of their removal, or may consolidate them with other friendly tribes or bands; and he may further, at his discretion, cause the whole, or any portion of the lands hereby reserved, or such other land as may be selected in lieu thereof, to be surveyed into lots, and assign the same to such individuals or families as are willing to avail themselves of the privilege, and will locate thereon as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be practicable.

Indians may be removed from the reservation.

Tribes may be consolidated.

Ante, p. 612.

ARTICLE. 8. The annuities of the aforesaid tribe shall not be taken to pay the debts of individuals.

Annuities of tribe not to pay individual debts.

ARTICLE 9. The said Indians acknowledge their dependence on the Government of the United States, and promise to be friendly with all citizens thereof, and they pledge themselves to commit no depredations on the property of such citizens. And should any one or more of them violate this pledge, and the fact be satisfactorily proven before the agent, the property taken shall be returned, or in default thereof, or if injured or destroyed, compensation may be made by the Government out of their annuities. Nor will they make war on any other tribe except in self-defence, but will submit all matters of difference between them and other Indians to the Government of the United States or its agent for decision and abide thereby. And if any of the said Indians commit any depredations on any other Indians within the Territory, the same rule shall prevail as that prescribed in this article in case of depredations against citizens. And the said tribe agrees not to shelter or conceal offenders against the United States, but to deliver up the same for trial by the authorities.

Indians to preserve friendly relations.

To pay for depredations.

Not to make war, except.

To surrender offenders.

ARTICLE 10. The above tribe is desirous to exclude from its reservation the use of ardent spirits, and to prevent its people from drinking the same, and therefore it is provided that any Indian belonging thereto who shall be guilty of bringing liquor into said reservation, or who drinks liquor, may have his or her proportion of the annuities withheld from him or her for such time as the President may determine.

Annuities to be withheld from those drinking ardent spirits.

ARTICLE 11. The United States further agree to establish at the general agency for the district of Puget's Sound, within one year from the ratification hereof, and to support for the period of twenty years, an agricultural and industrial school, to be free to children of the said tribe in common with those of the other tribes of said district and to

United States to establish an agricultural, etc., school for the Indians; to provide tools and employ mechanics, etc.

provide a smithy and carpenter's shop, and furnish them with the necessary tools and employ a blacksmith, carpenter and farmer for the like term to instruct the Iindians in their respective occupations. *Provided, however*, That should it be deemed expedient a separate school may be established for the benefit of said tribe and such others as may be associated with it, and the like persons employed for the same purposes at some other suitable place. And the United States further agree to employ a physician to reside at the said central agency, or at such other school should one be established, who shall furnish medicine and advice to the sick, and shall vaccinate them; the expenses of the said school, shops, persons employed, and medical attendance to be defrayed by the United States and not deducted from the annuities.

A physician, etc.

The tribe is to free all slaves and not to acquire others.

ARTICLE 12. The said tribe agrees to free all slaves now held by its people, and not to purchase or acquire others hereafter.

Not to trade out of the United States.

Foreign Indians not to reside on the reservation.

ARTICLE 13. The said tribe finally agrees not to trade at Vancouver's Island or elsewhere out of the dominions of the United States, nor shall foreign Indians be permitted to reside in its reservation without consent of the superintendent or agent.

When treaty to take effect.

ARTICLE 14. This treaty shall be obligatory on the contracting parties as soon as the same shall be ratified by the President of the United States.

In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs, and the undersigned, chiefs, headmen and delegates of the tribe aforesaid have hereunto set their hands and seals at the place and on the day and year hereinbefore written.

Isaac I. Stevens, governor and superintendent. [L. S.]

Tse-kauwtl, head chief of the Makah tribe, his x mark. [L. S.]
Kal-chote, subchief of the Makahs, his x mark. [L. S.]
Tah-a-howtl, subchief of the Makahs, his x mark. [L. S.]
Kah-bach-sat, subchief of the Makahs, his x mark. [L. S.]
Kets-kus-sum, subchief of the Makahs, his x mark. [L. S.]
Haatse, subchief of the Makahs, his x mark. [L. S.]
Keh-chook, subchief of the Makahs, his x mark. [L. S.]
It-an-da-ha, subchief of the Makahs, his x mark. [L. S.]
Klah-pe-an-hie, or Andrew Jackson, subchief of the Makahs, his x mark. [L. S.]
Tsal-ab-oos, or Peter, Neah village, his x mark. [L. S.]
Tahola, Neah village, his x mark. [L. S.]
Kleht-li-quat-stl, Waatch village, his x mark. [L. S.]
Too-whaii-tan, Waatch village, his x mark. [L. S.]
Tahts-kin, Neah village, his x mark. [L. S.]
Nenchoop, Neah village, his x mark. [L. S.]
Ah-de-ak-too-ah, Osett village, his x mark. [L. S.]
William, Neah village, his x mark. [L. S.]
Wak-kep-tup, Waatch village, his x mark. [L. S.]
Klaht-te-di-yuke, Waatch village, his x mark. [L. S.]
Oobick, Waatch village, his x mark. [L. S.]
Bich-took, Waatch village, his x mark. [L. S.]
Baht-se-ditl, Neah village, his x mark. [L. S.]
Wack-shie, Neah village, his x mark. [L. S.]
Hah-yo-hwa, Waatch village, his x mark. [L. S.]
Daht-leek, or Mines, Osett village, his x mark. [L. S.]
Pah-hat, Neah village, his x mark. [L. S.]
Pai-yeh, Osett village, his x mark. [L. S.]
Tsah-weh-sup, Neah village, his x mark. [L. S.]
Al-is-kah, Osett village, his x mark. [L. S.]
Kwe-tow'tl, Neah village, his x mark. [L. S.]
Kaht-saht-wha, Neah village, his x mark. [L. S.]
Tchoo-qunt-lah, or Yes Sir, Neah village, his x mark. [L. S.]
Klatts-ow-sehp, Neah village, his x mark. [L. S.]
Kai-kl-chis-sum, Neah village, his mark. [L. S.]
Kah-kwt-lit-ha, Waatch village, his x mark. [L. S.]
He-dah-titl, Neah village, his x mark. [L. S.]
Sah-dit-le-uad, Waatch village, his x mark. [L. S.]
Klah-ku-pihl, Tsoo-yess village, his x mark. [L. S.]
Billuk-whtl, Tsoo-yess village, his x mark. [L. S.]
Kwah-too-qualh, Tsoo-yess village, his x mark. [L. S.]
Yooch-boott, Tsoo-yess village, his x mark. [L. S.]
Swell, or Jeff. Davis, Neah village, his x mark. [L. S.]

MAKAH TRIBE

P.O. BOX 115 • NEAH BAY, WA 98357 • 360-645-2201

The Makah Tribe is an equal opportunity employer.

RESOLUTION NO.: **17-05**
DATE ENACTED: **02-03-05**

RESOLUTION NO. 17-05 OF THE MAKAH TRIBAL COUNCIL

WHEREAS, the Makah Tribal Council is the governing body of the Makah Indian Tribe of the Makah Indian Reservation, Washington, by authority of the Constitution and Bylaws of the Makah Indian Tribe as approved on May 16, 1936, by the Secretary of the Interior; and

WHEREAS, the Makah Tribe has a documented whaling tradition and has depended on whaling as the basis of its economy, subsistence, and culture for at least 1,500 years; and

WHEREAS, the 1855 Treaty of Neah Bay secures in perpetuity the Tribe's right of taking fish and whaling and sealing at all usual and accustomed grounds and stations; and

WHEREAS, the June 7, 2004 second amended opinion by the Ninth Circuit Court of Appeals on *Anderson v. Evans* 371 F.3d 475 (9th Cir. 2004) requires the Makah Tribe to seek a waiver and/or permit under the Marine Mammal Protection Act (MMPA) in order to exercise the whaling rights secured in the Treaty of Neah Bay.

NOW THEREFORE BE IT RESOLVED the Chairman of the Makah Tribal Council is authorized to submit the attached application under Section 101(a)(3) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. § 1371(a)(3), to the National Oceanic and Atmospheric Administration for a waiver of the moratorium on the taking of taking of marine mammals which would allow the Tribe to conduct a Treaty ceremonial and subsistence (C&S) harvest of up to 20 gray whales from the Eastern North Pacific (ENP) stock in a five-year period, with a maximum of five whales per year.

MAKAH TRIBAL COUNCIL

Ben Johnson Jr

Ben Johnson, Jr.
Chairman

CERTIFICATION

The foregoing Resolution was adopted at a regular meeting held on February 3, 2005, at which a quorum was present, and the Resolution was adopted by a vote of _3__ FOR and _0__ AGAINST, the Chairperson, or the Vice-Chairperson in his absence, being authorized to sign the Resolution.

By: JoDean Haupt-Richards
JoDean Haupt-Richards
Tribal Secretary

MAKAH TRIBE

P.O. BOX 115 • NEAH BAY, WA 98357 • 360-645-2201

January 24, 2006

William T. Hogarth, Ph.D.
Assistant Administrator
National Oceanic and
Atmospheric Administration
Room 14636
1315 East-West Hwy
Silver Spring, MD 20910

Re: Makah Tribe's clarification of MMPA waiver request application

Dear Dr. Hogarth,

On February 11, 2005, the Makah Tribal Council (Tribe) submitted a request to the National Marine Fisheries Service (NMFS) for a waiver of the Marine Mammal Protection Act (MMPA) take moratorium that would allow a limited harvest from the Eastern North Pacific stock of gray whales as secured in the 1855 Treaty of Neah Bay. We specified in the 2005 request that the total take of gray whales for which the Tribe seeks a waiver is up to 20 gray whales in any five-year period, subject to a maximum of five gray whales in any calendar year.

While our prior request focused on the MMPA waiver and also sought a simultaneous review under the National Environmental Policy Act (NEPA), we recognize that NMFS must analyze the proposed hunting activities in the context of additional laws and regulations. This letter clarifies that the Tribe is asking NMFS to analyze the 2005 request to conduct Treaty ceremonial and subsistence hunting of gray whales under whatever authorities it may deem applicable. In making this request, the Tribe reserves its right to contest a future determination by the United States government that a particular law or regulation may be applied to restrict the Tribe's ability to exercise its whaling rights under the Treaty of Neah Bay.

Sincerely,

MAKAH TRIBAL COUNCIL

Ben Johnson Jr

Ben Johnson, Jr.
Chairman

CC: Robert Lohn, NMFS Northwest Regional Administrator
Stanley Speaks, BIA Northwest Regional Director

Resolution No. 57-01
Date Enacted 5-30-01
subject Matter: Makah Gray Whale Management Plan Amendments

RESOLUTION NO. 57-01 OF THE MAKAH TRIBAL COUNCIL

WHEREAS, the Makah Tribal Council is the governing body of the Makah Indian Tribe of the Makah Indian Reservation, Washington, by authority of the Constitution and By-Laws of the Makah Indian Tribe as approved on May 16, 1936, by the Secretary of the Interior;

WHEREAS, the Treaty of Neah Bay secures in perpetuity the Tribe's right of taking fish and whaling and sealing at all usual and accustomed grounds and stations;

WHEREAS, on October 23, 1997, the International Whaling Commission approved the Makah Tribe's request for an aboriginal subsistence quota of 20 gray whales which my be taken between the years 1998 and 2002;

WHEREAS, on January 341998, the Council adopted Resolution No. 67-98 which adopted the Management Plan for Makah Treaty Gray Whale Hunting for the Years 1998-2002;

WHEREAS, after consultation with the Makah Whaling Commission and the National Marine Fisheries Service, the Council has determined that it is necessary to amend the Management Plan so as to allow for greater flexibility in the times and areas in which Tribal members are permitted to hunt while still providing a high margin of safety for the conservation of the gray whale and public safety;

NOW THEREFORE BE IT RESOLVED that Makah Gray Whale Management Plan for 1998-2002 is hereby amended as set forth in the Makah Gray Whale Management Plan for 1998-2002 As Amended April 2001 attached hereto.

MAKAH TRIBAL COUNCIL

By: Greig W. Arnold

Greig Arnold
Chairman

CERTIFICATION

The foregoing Resolution was adopted at a regular meeting; held on 5-30-01 at which a quorum was present, and the Resolution was adopted by a vote of 3 FOR and 0 AGAINST, the Chairman or the Vice Chairman in his absence, being authorized to sign the Resolution.

By: [signature]
Tribal Secretary

MANAGEMENT PLAN FOK MAKAH TREATY GRAY WHALE HUNTING FOR THE YEARS 1998-2002 AS AMENDED APRIL 2001

I. Introduction.

The purpose of this plan is to set forth the Makah Tribe's management intent and applicable Tribal regulations to govern the exercise of treaty ceremonial and subsistence whaling rights during the period 1998 through 2002. This management plan is adopted pursuant to Article 4 of the Treaty of Neah Bay, and the International Convention for the Regulation of Whaling ("ICRW") Schedui: Amendment adopted by the International Whaling Commission ("IWC") on October 23, 1997, Under the ICRW Schedule Amendment, the Makah. Tribe is authorized to share a five year aboriginal subsistence quota of 620 gray whales with the indigenous people of Chukotka, Russia.

The IWC was informed that under an Agreement between NOAA and the Council, the Makah gray whale harvest would not exceed 5 1 anded whales per year. The management plan contains a number of additional management measures adopted voluntarily by the Tribe to ensure the orderly development of safe, humane, and culturally appropriate whale hunts. In accordance with the ICRW Schedule Amendment, the management plan strictly prohibits commercial sale of whale products except for traditional handicrafts (including artwork) made from non-edible parts of the whale. No international trade is permitted.

It is the Tribe's intent to provide for the gradual development of ceremonial and subsistence whale hunts over the five-year period so as to allow for the development of Tribal management capabilities, refinement of hunting methods, and assessment of the Tribe's cultural and subsistence needs. The Tribe intends to utilize the experience and information collected during the five year term of this plan to develop a second multi-year plan, pending IWC review of the current ICRW Schedule. The conservative management approach provided for in this management plan is not intended to limit, waive or modify any of the Tribe's whaling rights under the Treaty of Neah Bay and any such construction of this plan is improper and unauthorized.

II. Definitions.

A. "Calf" means any whale less than 1 year old or having milk in its stomach.

B. "Council" means the Makah Tribal Council.

C. "Commission" means the Makah Whaling Commission.

D. "Landing" means bringing a whale or any parts of a whale onto land in the course of whaling operations.

E. "Member" means an enrolled member of the Makah Indian Tribe.

F. "Natural Resources Department" or "NRD" means the Makah Natural Resource Department.

G. "Strike" means any blow or blows delivered to a whale by a harpoon, lance, rifle, explosive device or other weapon., When used as a verb, "strike" means the act of delivering such a blow or blows to a whale. A harpoon blow is a strike only if the harpoon is embedded in the whale. Any rifle shot which hits a whale is a strike, For purposes of Parts III.C and III.F, multiple strikes on a single whale shall count as a single strike.

H. "Take" means to flag, buoy or make fast to a whale catcher, including a canoe, chase boat or support boat.

I. "Tribe" means and "tribal" refers to the Makah Indian Tribe.

J. "Whale products" means any unprocessed part of a whale and blubber, meat, bones, whale oil, meal and baleen.

K. "Whaling" means the scouting for, hunting, striking, killing, or landing of a whale.

L. "Whaling captain" means the member in charge of a whaling team who holds a whaling permit issued by the Commission and approved by the

Council under this management plan.

M. "'Whaling expedition" means a complete voyage in which a whaling team leaves port or shore for the purpose of whaling and returns to port or shore.

N. "Whaling team" means a group of members under the control of a whaling captain who holds a whaling permit issued by the Commission and approved by the Council under this management plan.

III. Harvest **Quotas/Strike** Limits.

A. The total number of gray whales taken by members in any one calendar year shall not exceed five (5).

B. The total number of gray whales taken by members between 1998 and 2002 shall not exceed twenty (20).

C. The total number of gray whales struck by members between 1998 and 2002 shall not exceed thirty-three (33), provided that the Commission and the Council will take prudent management measures to reduce the ratio of struck whales to landed whales in any one calendar year to no more than 2:1. The total number of gray whales struck by members between 2001 and 2002 shall not exceed fourteen (14).

D. No member may strike a gray whale calf or a female gray whale accompanied by a cal for calves.

E. No member may strike a whale other than a gray whale.

F. The total number of gray whales struck by members between 2001 and 2002 in the Strait of Juan de Fuca east of the Tatoosh-Bonilla line or between June 1 and November 30 in the Pacific Ocean west of the Tatoosh-Bonilla line shall not exceed five (5).

IV. Permits.

A. No member may engage in whaling except under the control of a whaling captain who is in possession of a valid whaling permit issued by the Commission and approved by the Council. All whaling permits issued by the Commission and approved by the Council shall incorporate all of the requirements of this management plan and any additional requirements the Commission and Council deem appropriate. Upon reaching the strike limit in Part III.F above. whaling permits shall be issued with the intem of targeting migrating, whales.

B. Any whaling permit issued by the Commission and approved by the Council shall be issued only to a whaling captain certified by the Commission pursuant to Part V below. The permit shall identify the vessels which will participate in the hunt, the members who will be part of the caplain's whaling team, and the boundaries of the designated area in which hunting will be permitted.

C. The Commission shall not issue and the Council shall not approve a whaling permit without determining that the whaling captain and each whaling team member has been certified by the Commission as qualified to perform his assigned role on the whaling, team.

D. The Council shall provide at least 24 hours advance notice to the National Marine Fisheries Service ("NMFS") and the United States Coast Guard ("USCG") prior to approving a whaling permit. The advance notice requirement shall not apply if a NMFS observer is already present on the Makah Reservation. The whaling captain shall coordinate with the on-site NMFS observer and the Coast Guard prior to departing on a whaling expedition.

E. A whaling permit shall terminate when any one of the following events occurs: (1) the whaling team lands a gray whale; (2) the whaling team. strikes a gray whale but is unable to land it; (3) the whaling team has not struck or landed a whale within 1.0 days of permit approval; or (4) the Commission or the Council determine, for any reason, to terminate the permit.

F. The Commission may issue a whaling permit cnly after determining that there is an unmet traditional subsistence or c ıltural need for whale products in the tribal community.

V. **Training/Qualifications.**

The Commission shall establish certification guidclir es and a certification process for whal ing captains, harpooners, riflemen, dive 's, canoe paddlers, and other whaling teammembers. The certification guidelines and the certification process shall ensure that every whaling captain and each member who serves on a whaling team has received adequate training to perform his assigned role on the team. Certification of riflemen shall include a demonstration of proficiency and accuracy under simulated hunting con ditions.

VI. **Whaling** Vesselis, Equipment and Hunting Method:,.

A. A whaling team must include one or more canoes,. one or more chase boats, and one or more support boats.

B. All canoes used in whaling must be at least 3 0 feet in length and manned by a harpooner and at least six paddlers.

C. All. chase boats used in whaling must be at least 18 feet in length and powered by an, engine large enough to tow an adult gray whale: to port, Each chase boat shall be manned by a pilot, diver, rifleman, and harpooner. The diver or an additional crew member shall act as a safety officer. One boat shall be equipped with a navig ation system capable of precisely fixing the vessel's position on the water.

D. All whaling harpoons must be equipped with a toggle point, connected to one or more floats, and bear a permanent disti active mark identifying the whaling captain who is in charge of the whaling team using the harpoon.'

E. The rifle used in gray whale hunts shall be ran adequate very high-powered rifle (.458 caliber or higher), approved by the Commission far use in whaling.

F. The first strike made upon a gray whale shal I be r iade by the harpooner on a canoe and shall affix one or more floats to the whale. The chase boat will pursue the whale and the rifleman aboard the chase boat will kill the whale as expeditiously as practicable with rifle shots directed at the whale's brain and upper spinal cord.

G. The rifleman on the chase boat shall not discharge his weapon until authorized to fire by the safety officer. The safety offices will not authorize the discharge of the rife unless: (1) the barrel of the rifle is above and within 30 feet or less from the target area of the whale; and (2) the safety officer determines that the rifleman's field of view is clear of all persons, vessels, buildings:, vehicles, highways and other objects or structures that if hit by a rifle shot could cause injury to human life or property.

H. The whaling captain will suspend the hunt, if the safety officer determines that visibility is less than 500 yards in any direction.

I. Upon the death of a whale, the chase boat crew will secure the whale for towing to shore. The whale will be expeditiously towed to shore by a chase or support boats.

J. By following the general procedures set out herein, whaling teams shall make best efforts to land every whale that is struck and shall ensure that the hunt does not pose a risk to human life and property.

K. The Commission shall conduct research and. development to further refine the hunting methods set out in this management plan. Upon consultation with the Commission and the National Marine Fisheries Service, the Council may periodically amend the provisions of this part to improve the safety, effectiveness and humaneness of gray whale hunts.

‘VII, Area **Restrictions.**

A. All whaling shall occur within the adjudicated usual and accustomed grounds of the Makah Tribe.

B. Within the area open to whaling under paragraph A above, whaling may be confined to an area designated by the Commission and the Council in each whaling permit.

C. The initial strike of a whale shall not occur within 200 yards of Tatoosh Island or White Rock between May and September.

D. A whale shall not be struck within the “closed area” designated in Section 10.5.02 of the Makah Law and Order Code (Weapons Control Ordinance No, 43 enacted 9/5/89) or east of the “closed area” to a line extending from the southern end of Waadah Island to Baada Point

E. Whaling may occur only within the Regulated Navigation Area (RNA) established by the United States Coast Guard as amended.

VIII. Use of Meat **and** Whale Products.

A. Whale products taken pursuant to this management plan shall be used exclusively for local consumption and ceremonial purposes and may not be sold or offered for sale. No member may receive money for participation in whaling.

B. Notwithstanding paragraph A above, traditional handicrafts (including artwork) made from non-edible whale products may be sold or offered for sale within the United States. A member may not engage in international trade of these handicrafts.

C. The Commission shall periodically monitor the utilization of whale products within whaling families and the tribal community to determine when an unmet need for whale meat or other products exists The Commission may conduct research. in order to accurately and systematically estimate the 'Tribe's traditional subsistence and cultural needs.

IX. Monitoring and Reporting.

A. A Makah Natural Resources Department ("NRD") representative will accompany each whaling team as an observer. Upon request of NMFS, the NRD representative will permit an additional observer from the Northwest Region of the National Marine Fisheries Service to observe the hunt.

B. The NRD observer shall. be responsible for recording the time, date and precise location of each whale struck. For each whale struck, the NRD observer shall record whether the whale is landed. If the whale is not landed, the NRD observer shall describe the circumstances associated with the striking of the whale and estimate whether the animal suffered a wound that might be fatal.

C. For each whale landed, the NRD observer shall record the body length (as measured from the point of the upper jaw to the notch between the tail flukes), the extreme width of the flukes, and the sex of the whale. The NRD observer shall also record the length and sex of any fetus in the landed whale.

D. The NRD observer shall record the time interval between the initial strike and the death of the whale.

E. The NRD shall be responsible for compiling and transmitting the weekly and annual reports required under the Agreement between the Council and NOAA. During periods in which whaling permits have been issued, the NRD will provide the National Marine Fisheries Service with a weekly oral report regarding the number of whales struck and landed. To the extent specified in any bilateral agreement, the NRD will also provide periodic oral or written reports regarding the number of whales struck and landed to representatives of the Russian 'Federation,

F. By January 30 of each year, the NRD and the National Marine Fisheries Service will prepare a joint written report compiling all of the data. accorded by the NRD under paragraphs B through D above, as well as any additional data recorded by National Marine Fisheries Service personnel.:

G. The NRD will assist National Marine Fisheries Service personnel in the collection of specimen material from landed whales, including but not limited to, ovaries, ear plugs, baleen plates, stomach contents, and tissue samples. The NRD may collect additional samples for its own use as part of the Tribe's research and management activities.

X. Enforcement.

A. The Natural Resources Enforcement Division shall be the Tribal law enforcement agency responsible for enforcing the requirements of whaling permits and this management plan.

B. Any member found whaling in violation of this management plan or the terms of a whaling permit issued by the Commission and approved by the Council. shall be subject to prosecution in Tribal Court for a Class AA criminal offense in accordance with the procedures set forth in Title 2 of the Makah Law and Order Code.

C. A whaling captain shall be deemed liable for any violations of a whaling permit or this management plan committed by a member of a whaling team under his control.

XI. Penalties.

A. Any member convicted by the Tribal Court of the offense of whaling in violation of this management plan or the terms of any whaling permit issued by the Council shall be subject to the penalties for a Class AA criminal offense under Section 5.8.01 of the Makah Law and Order

Code?

B. Members convicted of said offense may also be barred from exercising treaty fishing, hunting and/or whaling rights for up to three (3) years.

C. In determining the severity of punishment, the Court shall consult with the Commission and take into account the seriousness of the injury to the Tribe and Tribal resources.

XII. Amendments.

The Council may amend this management plan from time to time in consultation with the Commission and NOAA as new information becomes available, provided that the requirements of the management plan shall comply with the ICRW Schedule Amendment, any cooperative agreement between NOAA and the Council, and all applicable federal law.

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[1] Section 5.8.01 of the Makah Law and Order Code currently provides that Class AA offenses are punishable by a fine not to exceed $5000 and imprisonment not to exceed 12 months.